By Matthias Koops

HISTORICAL ACCOUNT

OF THE

SUBSTANCES

WHICH HAVE BEEN USED TO

DESCRIBE EVENTS, AND TO CONVEY IDEAS,

FROM THE

EARLIEST DATE,

TO THE

INVENTION OF PAPER.

PRINTED ON THE FIRST USEFUL PAPER MANUFACTURED SOLEY FROM STRAW.

London

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1800.

16756

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TO

HIS MOST EXCELLENT MAJESTY

GEORGE THE THIRD,

KING OF GREAT BRITAIN, FRANCE,

IRELAND, *&c. &c. &c. &c.*

MOST GRACIOUS SOVEREIGN,

SIRE,

YOUR MAJESTY having been MOST GRACIOUSLY pleaſed to grant me Patents for extracting Printing and Writing Ink from Waſte-Paper, by reducing it to a Pulp, and converting it into White Paper, fit for writing, printing, and for other purpoſes; and alſo for manufacturing Paper from Straw, Hay, Thiſtles, waſte and refuſe of Hemp and Flax, and different Kinds of Wood and Bark, fit for printing, and other uſeful purpoſes,

I therefore moſt ſubmiſſively entreat permiſſion to lay at YOUR MAJESTY's feet the firſt uſeful Paper which has ever been made from Straw, without any rags or addition, and on which theſe lines are printed; but at the ſame time moſt humbly beg leave to obſerve to YOUR MAJESTY, that this Paper is not yet in ſuch a ſtate of perfection as it will hereafter be, when the neceſſary implements are completed, and the Manufactory regularly eſtabliſhed and farther advanced; but as there now can be no doubt that good and uſeful Paper may be manufactured ſolely from Straw, I

thought it my duty (imperfect as it is) to present to my MOST GRACIOUS SOVEREIGN, who is ever ready to receive favourably the most humble endeavours which tend to the common welfare, and who, at the same time, is the benevolent Father of his Subjects, and has ever proved himself the Patron and Protector of the Arts and Sciences, the first Paper made of Straw.

Might I but be persuaded that YOUR MAJESTY would deign to look favourably on these my humble attempts of discovery, it would be a constant incitement to future inquiry, and the prospect of meriting YOUR MAJESTY'S commendation will be the greatest pleasure my heart can be sensible of.

With my most ardent wishes for YOUR MAJESTY'S health and longevity, and with all possible deference and humility, I beg leave, MOST GRACIOUS SOVEREIGN, to subscribe myself,

YOUR MAJESTY'S

most devoted,

most obedient,

and most humble servant,

September, 1800. Matthias Koops

THE art of Paper-making ought to be regarded as one of the moſt uſeful which has ever been invented in any age or country; for it is manifeſt, that every other diſcovery muſt have continued uſeleſs to ſociety, if it could not have been diſſeminated by manuſcripts, or by printing.

Scientific men, who were neither artiſts nor manufacturers, have, by means of this invention, been enabled to communicate their projects, which mechanics have afterwards improved and perfected, and by this means enriched the commonwealth.

Without the uſe of Paper, geography and navigation muſt have been very incorrectly underſtood; the beautiful charts of the ocean ſo accurately laid down have eſtabliſhed our commercial intercourſe with every part of the globe with ſafety; at the ſame time that the delineations upon maps of places, rivers, and countries, are now ſo correct, that they enable a traveller to proceed without danger, and even predict, with certainty, the time it will require to convey him to any part of the globe.

It may be aſſerted, indeed, of this country, that its grandeur and commercial dignity have been greatly exalted by the invention of Paper; for it is preſumed, that the ſuperiority which diſtinguiſhes the manufactures of this Iſland, chiefly depends upon the liberal publications concentered from all the reſt of the world, which have ſo greatly increaſed in latter years, and which are likely farther to be augmented. It is, in ſhort, the reputation of the goods fabricated in Great Britain, which has elevated it to the ſplendour and fame it now poſſeſſes, in the ſcale of nations, and enables it to monopolize the trade of the univerſe.—All theſe are benefits which have flowed from the invention of Paper, and which have ſo largely contributed to the preſent flouriſhing ſtate of the country.

What infinite trouble and labour, what a fruitleſs conſumption of time has not been ſaved by the knowledge of Paper! how many laborious and dangerous experiments have not philoſophical projectors been ſpared! what labour of inveſtigation and ſtudy have not been abridged by the events which the experiments of others have handed down to poſterity! thereby affording to the preſent age a body of information more than adequate to the knowledge any one man could have attained to in a thouſand years, with all his faculties.

This reflection alone muſt fix ſuch an impreſſion on any thinking mind of the invaluable utility of Paper, as to render any farther commendation unneceſſary; but, in ſhort, the

invention

invention of Paper has been the ſole cauſe of the various gradations of improvement in every art and ſcience. Without it the preſent age would neither have been more civilized nor wiſer than it was many centuries ago, becauſe one age could never have conveyed to its poſterity what the labours of the paſt had atchieved; for it is well known that, in dark and barbarous ages, the inhabitants of no country have ever made any progreſs towards improvement and civilization without the uſe of Writing, Printing, and Paper; and it ſeems very probable, that the early knowledge of this article amongſt the Chineſe has been the cauſe of thoſe acquirements which have diſtinguiſhed that truly wonderful nation: for it may be affirmed, that in proportion to the quantity of Paper conſumed, by any ſtated number of inhabitants in literary purſuits, ſo will be their comparative information, civilized ſtate, and improvement.

To enumerate all the various advantages which the invention of Paper has afforded mankind, could not be contained in an Eſſay of this nature: its uſes are unqueſtionable; and the important ſervices it has yielded to all countries where it has been employed are not to be calculated; it is ſufficient to ſay here, that the growing youth are educated with facility in the principles of their duty, and barbarous ſtates have been ſoftened and enlightened by means of this diſcovery.

Although this ſubject might be much enlarged upon, the intention of this Addreſs is moſt humbly to preſent to

Your Moſt Gracious Majeſty the *firſt* uſeful Paper manufactured *ſolely* from *Straw*, and on which theſe lines are printed.

From the remarks which have been already made, every perſon muſt be convinced, that it is of the utmoſt conſequence to prevent the ſcarcity of the materials from which Paper is to be fabricated. Although cotton has been likewiſe uſed for this purpoſe, paper-makers in this country have depended on linen Rags for the regular purſuit of their employment.

All Europe has of late years experienced an extraordinary ſcarcity of this article, but no country has been ſo much injured by it as England. The greatly advanced price, and the abſolute ſcarcity, equally operating to obſtruct many printing-preſſes in this kingdom; and various works remain, for theſe reaſons, unpubliſhed, which might have proved very ſerviceable to the community.

The great demands for Paper in this country have rendered it neceſſary to be ſupplied from the continent. This ſupply is extremely precarious, and is likely to be more wanted, as the conſumption of Paper increaſes, becauſe the material, which is the baſis of Paper, is not to be obtained in England in ſufficient quantity. The evil conſequence of not having a due ſupply of Rags has been the ſtoppage of a number of Paper-mills; for it is a manufactory which requires numerous hands (of men, women, and children);

a great number of whom have been thrown upon their reſpective pariſhes for want of employment. A ſtill more important conſideration, in the view of commerce, preſents itſelf, when the raw material comes from abroad, becauſe the importation of it is paid in hard caſh, the preparation of which might have employed numbers of idle hands at home advantageouſly.

Theſe reflections induced me to make various experiments, with a view to remedy, in ſome degree, this evil; and, after many trials, I have the ſatisfaction to remark, that I have diſcovered a ſubſtitute for linen Rags, which has been heretofore unknown, and which will merit the attention of the public. This diſcovery is the Art of extracting Printing and Writing Ink from Waſte-Paper, whether in ſmall or large Pieces, obliterating the ink, and rendering the Paper perfectly white, *without injuring the texture* of the regenerated Paper, and of a quality as good as it originally was, for the purpoſes of writing and re-printing.

It is worthy of the directors of families to order their ſervants to ſave all the waſte White Paper, ſuch as letters and old writing-paper, which are generally thrown away or burnt, and regarded as of no conſequence; for, ſhould this be attended to, very conſiderable quantities would be collected, and large ſums of money ſaved, which are now expended in foreign countries for Rags; becauſe, if we calculate that Great Britain contains fifteen hundred thou-

ſand

ſand families, and that half a ſheet of Paper ſhould be daily ſaved in every family, it would produce four thouſand four hundred tons,* which is about one-third of the quantity of Rags which have, of late, been converted annually into Paper in this country; whereby near two hundred thouſand pounds would annually remain in this country, which ſum is now ſent abroad for the purchaſe of Rags; and eighty-two thouſand one hundred and twenty-five pounds would be ſaved from fire and deſtruction, calculating a pound of old Paper torn into pieces at two-pence.

I HERE beg leave to obſerve, that, although the wiſdom of the law has given, for a certain number of years, an excluſive right to Patentees, as an encouragement to promote the ſkill and induſtry of individuals, and to encourage new and uſeful diſcoveries, all Patents labour yet under one great evil, which ſeems to have been overlooked by the legiſlature; which is, that the publicity of all exemplifications give foreign countries an opportunity of availing themſelves, by examining the Patent-Office, and obtaining a knowledge of the diſcovery, in the particular branch to

* A ream, or five hundred ſheets, being calculated at eighteen pounds weight.

which it relates, of thoſe advantages which are ſecured in this country to the Patentee alone. They are thereby enabled to take immediate advantage of the information, and eſtabliſh the manufactory abroad, to the irreparable detriment of Britiſh commerce, as well as the Patentee, who, perhaps, ſuffers an immenſe loſs in one day, on an invention which he had indefatigably laboured at for many years, and at great expenſe, to bring to perfection: for, ever ſince the year 1794, books have been publiſhed with an exemplification of all Patents granted by *Your Majeſty*, with the drawings and complete deſcription of all new-invented and improved machines, which books are exported, and tranſlated into ſeveral languages, by which means the merchant and manufacturer on the continent get the copy of every ſpecification. It is therefore, a ſubject meriting much attention, to ſtrike out ſome plans which would, in future, fruſtrate ſuch attempts.

It has been imagined, that the preſent war has principally contributed to produce the ſcarcity of paper-ſtuff, which, however, does not appear to be the ſole cauſe, becauſe the quantity of rags uſed for making lint is very inconſiderable, compared to the enormous quantity at preſent uſed for the manufacture of Paper. Cartridges have uſually been made on the continent of old written Paper, which heretofore has been of no other uſe to Paper-makers than for the fabrication of paſte-

boards.

boards.—It appears, from various conſiderations, that the ſcarcity has originated from the extenſion of learning, which occaſions much larger quantities of Paper for writing and printing; the large increaſe of newſpapers and monthly publications. Additional ſtationers, printers, and bookſellers, countenance this opinion. More children are now every where taught to read and write; and the hand-bills of every deſcription, uſed for ſhopkeepers, plays, quackery, and other trades, require additional quantities of Paper. Paper-hanging, which is an invention of the middle of the ſeventeenth century, has, of late years, become more general; and few new-built houſes are finiſhed with walls, or wainſcot, as formerly, but the ſurface is every where decorated with painted or ſtained Paper, which is the moſt beautiful, the cleaneſt, and the cheapeſt ornament for furniſhing rooms.

I beg leave to obſerve, that little general knowledge, upon this uſeful ſubject, has been hitherto communicated to the public; I, therefore, will endeavour to give a brief hiſtorical account of the various methods and materials which have been uſed to convey ideas to poſterity, from the moſt ancient date to the period when the art of making paper, from linen rags, was invented.

The art of writing, in itſelf, proves that mankind, at the time of its invention, muſt already have been in a certain degree civilized, and cannot therefore be very ancient; but the exact time when this art was diſcovered is impoſſible to trace.

In

In the moſt ancient time, when writing was not yet diſcovered, very ſimple means were uſed to preſerve the remembrance of important events. Tradition repreſented, therefore, during many centuries, what now is more completely effected by writing and printing. Trees were planted, heaps of ſtone, or unornamented altars and pillars, were erected, plays and feſtivals were ordered, and ſongs ſung to keep up the recollection of paſt facts. The ſacred hiſtory mentions, that the Patriarchs erected altars or heaps of ſtones as remembrances of paſt events.

Rough ſtones and ſtakes were the firſt reminding letters of the Phœnicians. In the environs of Cadiz, ſeveral heaps of ſtones have been found; monuments of Hercules's expedition againſt Spain. The ancient inhabitants of the North placed, in different ſituations, ſtones of an extraordinary large ſize, to remember great events. And we have found, in modern times, that the ſavages in America do the ſame; and ſome place bows on the tombs of men, and mortars with peſtles on the tombs of women. It has been likewiſe a cuſtom to give names to certain places, and their environs, which referred to the tranſactions and deeds which there took place.

Since the art of writing was invented, ſeveral materials have been uſed on which was engraved or written what was wiſhed to be conveyed to poſterity. But nothing poſitive can be aſcertained with reſpect to the different materials employed by the ancients for that purpoſe, except that a diſtinction has

been

been made between public records and private writings. For the firſt; ſtones, timber, and metals, were chiefly uſed; and, for the latter, leaves and bark of trees. The Egyptians, the inhabitants of the Northern countries, and ſeveral others, made uſe of ſtones, rocks, and pillars, for that purpoſe.

Job mentions rocks as the materials uſed in his time; and the Danes engraved likewiſe upon rocks the deeds of their anceſtors.

Joſephus has related, that the children of Seth had, before the deluge, erected two pillars, and thereupon engraved their inventions and aſtronomical diſcoveries, the one of which was of ſtone, and the other of brick-clay, becauſe they had heard, from their grandfather, Adam, that the world would be deſtroyed once by fire, and once by water; and, to prevent their knowledge of the motion of planets, &c. being loſt to poſterity, they had engraved it on the before-mentioned pillars, the one of which could not be deſtroyed by water, nor the other by fire; and the ſame author ſtates, that the ſame pillar of ſtone exiſted ſtill, in his time, in the country of Siriad. But where that country was ſituated is very difficult to aſcertain; ſome ſay in Syria. Marſham, Voſz, and others aſſert it to be *Seirath*, mentioned in the Scripture, (*Judges, chap.* iii. *verſe* 26); the moſt likely ſuppoſition ſeems to be, according to Dodwell, Stillingfleet, and Fabricius, that it was ſituated in Egypt.

Theſe pillars bring into recollection others more celebrated, erected by Bacchus, Hercules, Oſiris, and Seſoſtris, to commemorate their exploits. But the moſt famous were the pillars of Mercury Triſmegiſtus, on which his doctrines and rules were engraved with hieroglyphic characters. Porphyrius mentions ſome pillars in the Iſland of Crete, on which the ſacrificial ſervice of Cybeles, and the religious rites were engraved; and, at the time of Demoſthenes, there was ſtill a column of ſtone exiſting, on which the code of laws was engraved. Numerous other pillars could be mentioned, but it is ſufficiently aſcertained, that the moſt ancient nations were not acquainted with any other method of keeping in remembrance their code of laws, acts and contracts, the hiſtory of events, and important diſcoveries; and theſe public records have been the ſources of knowledge for the major part of the ancient authors.

It was likewiſe a cuſtom to write on bricks, and ſtone plates, principally to immortalize laws, inſtitutions, and important events.

The Babylonians, according to Pliny, wrote their firſt aſtronomical obſervations on bricks, and the oſtraciſm of the Athenians was inſcribed on oiſter-ſhells, and the fragments of broken pots.

The moſt ancient monuments of Chineſe knowledge were engraved on hard and large ſtones. The ten commandments were written on marble plates. Joſhua wrote the other laws

on plates of the ſame kind, and the names of the twelve Jewiſh tribes were carved on precious ſtones on the ephod of the high prieſt. The inſcriptions on Mount Sinai, and the ſurrounding mountains, ought to be noticed here, if their antiquity could be aſcertained. The hieroglyphics of the Egyptians are chiefly found on obeliſks, ſtone pillars, &c. and the decrees of Lycurgus were carved in ſtone. A very ancient Grecian ſuperſcription on ſtone is exiſting on the weſt borders of Aſia Minor, where the Mitylenians have built the city of Sigium, from the gathered ſtones of the city of Troy. This city was deſtroyed long ago by the Ilienſians; the ſtone ſtill lies in the village of Ieni-Hiſſary, called, by the Turks, Gaurkioi, before the porch of the Greek church, and is uſed for a ſeat. The inſcription on this ſtone is now upwards of 2360 years old. William Sherard, Eſq. Britiſh Conſul, at Smyrna, took the firſt copy of it; and Samuel Liſle, preacher to the Engliſh reſiding at Smyrna, copied it carefully, and it was afterwards engraved and printed in London, on nine ſheets, by his Majeſty's chaplain, Edmund Chiſhull, with explanations, in the year 1721. Still more ancient inſcriptions at Amyclae have been diſcovered, and publiſhed by Fourmont and Barthelemy. They are written in the ſame manner as thoſe of Sigeum, reſembling plough-furrows, but they go from the right to the left, and were preſerved in the Royal Cabinet, at Paris. Numerous other ancient inſcriptions on ſtone are found commemorated in Carſten Niebuhr's Travels in Arabia. The convention of Smyrna and Magneſia was engraved on marble 270 years before the birth of Chriſt, and the *Jus Publicum* of the Atheniaus was engraved on triangular ſtones,

named Cyrbes. Numerous old inſcriptions in the Etruſcan, Greek, and Latin languages, on ſtone and marble, on plates, urns, vaſes, and ſarcophagi, are ſtill preſerved in the firſt and ſeventh room of the gallery of the Grand Duke of Tuſcany, at Florence; and in the firſt room of that gallery are ſeveral inſcriptions on burnt clay, with which the Etruſcans covered their deceaſed friends. They are divided into twelve claſſes, and, notwithſtanding ſeveral of them have been proved to be counterfeit, by the colour of the marble, the moſt part are genuine, which ſatisfactorily proves the art of writing was known to the ancients.

But theſe materials were ſoon found to be difficult to write upon, and therefore others, more ſimple and more convenient, were ſought for. Bricks and ſtones were changed for different kinds of metals, and lead became then the moſt ancient writing ſubſtance. Job mentions, in chapter xix. verſe 24, engravings with an iron pen on lead; and Pauſanias ſays, that Heſiod's *Opera et Dies* was written on leaden tables. Pliny ſtates, that lead was uſed for writing, which was rolled up like a cylinder. Hertius wrote to Decius Brutus on leaden tables. In Italy were preſerved two documents of Pope Leo III. and Luitbrand, King of the Longobards; and, according to Kircher's Muſeum, Table X. many more of ſuch writings on lead are to be found. For example, Montfaucon notices a very ancient book of eight leaden leaves, the firſt and laſt was uſed as a cover, and that it contains numerous myſterious figures of the Baſilidians, and words partly Greek, and partly of Etruſcan letters. On the back were

rings

rings faſtened, by means of a ſmall leaden rod, to keep them together.

Bronze was afterwards more frequently uſed than lead, as is certified in the Hiſtory of the Maccabees, by Dionyſius of Halicarnaſſus, Cicero, Livy, Pliny, Suetonius, and Julius Obſequens. Phœnician letters were on the kettle of bronze, devoted by Cadmus to Minerva, who was adored at Lindus, on the Iſland of Rhodes. But, as the kettle is not only loſt, and the copies of the inſcription, with thoſe of Cadmiſian letters, on ſeveral tripod veſſels, mentioned by Herodotus, and others, I ſhall confine myſelf to thoſe which ſtill exiſt, of which the moſt remarkable are the famous *Scriptum de Bachanalibus*, in the Imperial Library; Trajan's *Tabula Alimentaria;* and the helmet, found at Cannae, with Punic letters, deſcribed in the *Muſeo Etruſco* of Gori, and which is now in the third room of the gallery of the Grand Duke of Tuſcany, at Florence. I cannot omit noticing the eight tables of bronze, found in the town of Gubbio, in a ſubterraneous cabinet, when, in the year 1444, parts of an amphitheatre were removed: on ſeven tables the inſcriptions were in the Latin, and one in the Etruſcan language. Since that time ſeveral bronze tables, with Etruſcan writing, have been dug up in Tuſcany. The ſeven Latin have been deſcribed and engraved on copper-plates, by Merula, Gruter, and others, and one by Thomas Demſter.

The criminal, civil, and ceremonial laws of the Greeks have been engraved on bronze tables, and the ſpeech of Claudius,

engraved

engraved on bronze plates, are yet preſerved at the town-hall of Lions, in France.

The celebrated ſtatutes or laws on twelve tables, the major part of which the Romans copied from the Grecian code, were firſt written on tables of oak, but according to others on ten ivory tables, and hung up *pro roſtris*. But, after they had been approved by the people, they were engraved in bronze. But theſe were melted through fire occaſioned by lightning which ſtruck the capitolium, and conſumed likewiſe numerous other laws for the cities and country, which were there depoſited; the loſs thereof was highly regretted by the Emperor Octavius Auguſtus. The laws of the Cretans were likewiſe engraved in bronze; and the Romans etched, in general, their code *plebiſcita*, contracts, conventions, and public records, in braſs, not only during the exiſtence of the republic, but likewiſe under the reign of the Emperors. The magiſtrates of Athens were choſen by lot; the names of the candidates were written on bronze plates, and put in an urn, with white and black beans, and the perſon whoſe name was taken out with a white bean was elected.

The pacts between the Romans, Spartans, and the Jews, were written on braſs, which method was likewiſe obſerved by the guilds and private perſons who uſually, for ſecurity, got the land-marks of their eſtates engraved on metal; and in many cabinets are yet to be ſeen the diſcharges of ſoldiers written on copper-plates. It is not long ſince, at Mongheer, in Bengal, a copper-plate was dug up, on which cha-

racters of Sanſcreet were etched, ſignifying a gift of land, from Bideram Gunt, to one of his ſubjects. This bill of feoffment, on copper, is dated 100 years before the birth of Chriſt, and proves at the ſame time that the Indians were, about two thouſand years ago, in a high degree of cultivation. Such genuine documents, written on ſuch hard ſubſtances, in more modern times are very ſcarce. The Archbiſhop Adelbert, of Mentz, ordered a grant to be engraved on metal plates, which privilege is kept over the door-wings of the church B. *Mariæ Virginis ad gradus*, in Mentz; and, in 1011, theſe door-wings were manufactured of caſt metal, reſembling bronze, by the Archbiſhop Willigis.

The Abbot Cabent, and the Benedictine Monk Legipont, entertain the opinion, that the moſt ancient writing material which has been uſed was wood. It is certain that box-wood and ivory have in thoſe times been uſually made uſe of to write upon, but of the preciſe time nothing can be aſcertained with certainty.

Iſaiah (chapter xxx. verſe 8), and Habakkuk (chapter ii. verſe 2), make mention of writings on a table, that it may be remembered for the time to come, for ever and ever. Solon's Civil Laws were written on boards, which were placed in a machine, conſtructed to turn them eaſily, called *axones;* and, even in the fourth century, the laws of the Emperors were publiſhed on wooden tables, painted with ceruſe, which gave riſe to the expreſſion in Horace: *Leges incidere ligno*. The Swedes had the ſame cuſtom, for which reaſon the laws are ſtill by

them

them named, *Balker*, originating from a piece of timber, called *Balken*, which is a balk or beam.

The Greeks and Romans uſed commonly, at an early period, either plain wooden boards, or covered with wax. The Greeks called wooden boards which were not covered with wax, *Schedæ* or *Schedulæ*. On ſuch *Schedulas* was written, in the Hebrew language, the Goſpel of Matthew, which, according to Baronius, in his *Martyrologio Romano*, was found in the tomb of the Apoſtle Barnabas. Thoſe overlaid with wax were named *Pugillares cerei*. Perſons who would privately correſpond, or give ſecret intelligence to others, wrote it on plain wooden boards, on which they laid wax after they had written on the wood. Pliny aſſures us, that the writing on wooden boards was a cuſtom even before the Trojan war. Such boards have been ſometimes ſimply named *Cera*, from which originate the deſcription *Cera prima*, *Cera ſecunda*, *Cera tertia*, &c. which ſignifies the firſt, ſecond, and third page. The ancient Juriſts unite often the words *Tabula* and *Cerae*. It appears notwithſtanding, that they deſcribe under the denomination of *Tabulis*, a carefully written work, and under that of *Ceris* and *Pugillaribus*, they comprehend a careleſs written manuſcript, or copy of writing. Numerous teſtaments have been made on *Tabulas ceratas*. But I recommend attention to the ſtated boards or tables, to prevent miſrepreſentation; becauſe, under the general deſcription of *Tabulæ*, is often underſtood not only wooden boards, but alſo ſtone, ivory, and metal tables and plates.

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The Romans employed for common uſe, and principally for writing letters, ſmall boards of common wood, overlaid with bees wax, which were ſealed in linen clothes; and, if the laſt will was written upon theſe boards, they were run through, and joined together with lace or tape. They uſed likewiſe very thin levelled boards, of ſoft wood, named, according to Martial, *Tenuès tabellas*, which were not overlaid with wax, but in which the letters were carved.

In the archives of the town-hall in Hanover, are kept twelve wooden boards, overlaid with bees wax, on which are written the male and female names of owners of houſes, and of houſes without noticing the ſtreets; but, as Hanover was divided, in 1428, into ſtreets, we have reaſon to believe, that theſe wooden manuſcripts are more ancient. Theſe boards are apparently of beech wood, and have on the four corners an elevation, and the places within are filled up with green wax. The firſt and laſt table ſerve, at the ſame time, as a cover, and are, therefore, only on one ſide overlaid with wax, but the others on both ſides. Theſe twelve boards form therefore only twenty-two pages; the outſide boards are joined by a piece of leather paſted on them, to form the back of the book, and the leather is faſtened, by nails, to the other ten boards. This curious manuſcript book is 1 foot 5 inches high, $8\frac{1}{2}$ inches wide, and about $5\frac{1}{2}$ inches thick, or each leaf about $\frac{1}{2}$ an inch. There is, beſides the before-mentioned elevation on the four corners, another croſs elevation, which divides every ſheet into four ſquare columns: on each page are between ſixty and ſeventy lines of Monkiſh letters, which are

apparently preſſed in the wax with a feſcue. Seven pages are in good preſervation. Another manuſcript, much like this, is in the gallery at Florence, in the third room in the eleventh ſcrine; another in the city library of Geneva; and ſeveral are ſtill exiſting in other libraries and archives.

The rich Romans uſed, inſtead of wooden boards overlaid with bees wax, thin pieces of ivory, named *libri eborci*, or *libri elephantini*; and Ulpian ſtates, that the principal tranſactions of great princes have been uſually written with a black colour on ivory. Flavias Vopiſcus ſays, that there was a book of ivory in the library of Ulpian. The exiſtence of ivory books has been fully aſcertained by Martial, Salmaſius, and Schwarz, notwithſtanding other authors have held out, that the name of *libri elephantini* originates from the enormous ſize of theſe books, or from the inteſtines of elephants, on which they have been written; but this is certain, that only the great and the rich were able to uſe ivory tables, becauſe they were ſcarce and dear.

It muſt be obſerved, that theſe with wax overlaid wooden tables were of different ſizes; and, according to Quintilian, likewiſe uſed to teach writing to beginners; and, according to Cicero, it ſeems that the critics were accuſtomed by reading wax manuſcripts to notice obſcure or wrong phraſes, by joining a piece of red wax. The Greeks and Romans continued ſtill to make uſe of ſuch boards, even at the time when writing on leaves of trees, on Egyptian Paper, on membranous ſubſtances, and on parchment, was already adopted, becauſe they

could thereupon put down their fugitive ideas, and change or correct them eaſily, before they wrote on other ſubſtances; and it has been proved, that even when linen Paper was firſt diſcovered, ſuch boards have been ſometimes made uſe of. The Chineſe have, in very ancient times, likewiſe written with iron large tools on boards, pieces of bamboo, and occaſionally on metal.

The uſe of boards was ſuperſeded by the uſe of the leaves of palm, olive, poplar, and other trees. According to Pliny, the Egyptians were the firſt who wrote on palm leaves, for which reaſon their letters obtained the name of Phœnixcian letters, becauſe the Greeks called the palm-tree *Phœnix*. In the library of the city of Strahlſund is a book ſtill to be ſeen, written on palm leaves. The Malabars yet write on leaves of the palm, *Corypha umbra culifera*, and form the letters with a feſcue at leaſt twelve inches long, and anoint the leaves afterwards with oil. The written letters are rolled up. Their books are of many ſuch leaves, which are joined together with a tape, and framed between two thin boards of the ſame ſize. There are ſtill Bibles preſerved, written on ſuch leaves; one is to be ſeen in the library of the univerſity of Gottingen, containing 5376 leaves, formed into 45 ſheets, which has been purchaſed from Baumgarten, in a public ſale; another is at Copenhagen; and one in the Orphan's houſe, at Halle. The explanation of twelve large volumes, with plants of Malabar, to be ſeen in the Academical Muſeum, at Gottingen, is moſtly drawn with a feſcue on palm leaves. In Heſſelberg's Library, at Copenhagen, was a part of the New Teſtament, written in the Malabar language, on palm leaves. The Bramin manuſcript,

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in the Kulingiennian language, which was ſent from Fort St. George to Oxford, is of Malabar palm leaves; and Mr. Aſtle ſtates, in his Origin and Progreſs of Writing, (chapter iv. page 49,) that in Sir Hans Sloane's library were more than twenty manuſcripts of palm leaves, written in different Aſiatic languages; and he ſays, (chapter viii. page 203) that he himſelf is in poſſeſſion of a manuſcript, written on palm leaves, in the Peguan language, which is 21 inches long, and 3½ inches wide; the ground of which is richly ornamented with gold, and the letters are inlaid with a black gummy-like ſubſtance.

Knox ſtates, in his Hiſtory of Ceylon, that there grows a kind of palm tree, of which the leaves are woolly, and of conſiderable breadth, named the panaga tree, which are uſed by the inhabitants for writing, after having taken off the outer ſkin. They uſe talipot tree leaves for the ſame purpoſe.

The ſentence of baniſhment *(petaliſmus)* of the Syracuſans was written on olive-tree leaves; and on the ſame kind of leaves were written the names of thoſe who were excluded from the Senate of Athens, which puniſhment was called *Ekphillophoreſis*. The Eaſt Indians have, and ſtill uſe, in ſome parts, leaves for writing. And, according to *Helvetius Cinna*, poplar-tree leaves have been likewiſe uſed.

The inhabitants of the Maldivia iſlands write on leaves of the macarcquo tree, which are three fathoms long, and one foot wide; and ſometimes on thin wooden boards after they have been painted white. In many places in the Eaſt Indies, the leaves of

muſa or banana tree were uſed for writing, till the Europeans introduced paper; and in the iſland of Java they ſtill write on the leaves of the lanter tree, which are very ſmooth, and five or ſix feet long. Several other eaſtern nations uſe, for that purpoſe, the leaves of the cocoa tree, the taon-conder tree, and of a tree named, by the Malays, olen, which grows every where plentifully in that country, and is a kind of wild palm tree, the leaves of which are about 1½ yards long, and 3 inches wide; for extenſive writings they are tied together. The letters are written thereon with an iron tool, which pierces the outſide covering, and makes indelible letters, which method is preferred by the Indians, becauſe they are ruled by the touch and not by the eye: thoſe leaves have a quality which makes them preferable to our paper; they are not only very ſtrong, but, if they remain even for a long time in water, they are not liable to rot or grow tender, and the writing is not deſtroyed, for which reaſon the natives continued to uſe them, notwithſtanding many paper-mills have been erected in India. It is remarkable, that poplar-tree leaves were principally uſed for ſacred writings, which may be the reaſon why Pythagoras calls the leaf of the poplar tree, a ſacred leaf.

The cuſtom of writing on leaves of trees was ſuperſeded by the uſe of the raw bark of trees, and the interior bark of the lime tree, of which Suidas remarks, that it reſembles *Papyrus;* and alſo the bark of elder, elm, and birch tree. The exterior bark *(cortex)* was ſeldom uſed, being too coarſe in general, and not ſufficiently ſmooth to write on legibly and eaſily. The interior bark *(liber)* was therefore preferred, being ſmooth

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and fine. From this originates the Latin name for a book. To carry thoſe barks commodiouſly in the pocket, they were rolled up, and called *volumen;* which name has been continued for rolls of paper and parchment, and for books, notwithſtanding our books have a very different ſhape. The name *codex*, or more properly *caudex*, ſtill in uſe, originates in a like manner; and notwithſtanding its true meaning is the trunk of a tree, it was adopted to deſcribe many ſheets of the ſaid bark together.

The ſhape of the bark on which the ancient Europeans wrote was not all of the ſame ſize, and thoſe manuſcripts are very ſcarce. Montfaucon ſays that there are none in Italy, and that he found only one in the archives of the city of St. Denis, in France. Cragus ſaw in the city of Chur, in Switzerland, ſome verſes of Virgil written on the interior bark of the birch tree. It is ſtated in *Acta Petropolitana*, tom x. page 449, that many whole books of this kind have been found in Siberia, the letters of which were in the language of the Calmuks. The ancient favorite ſong: *Eija mit hierta ratt innerlig*, &c. was called the Birch ſong, becauſe Elſa, the daughter of Andres, had originally written it on the bark of a birch tree. The protocols of the Emperors were in theſe times written on the ſame writing-material to prevent falſifying, becauſe, if the ſurface was ſhaved in the ſmalleſt degree the letters were deſtroyed, and could not be replaced by others. Several nations uſe it ſtill for writing, notwithſtanding paper is well known to them. Mr. von Juſti aſſerts that he poſſeſſes a letter written, in the Malabar language, on the bark of a tree; and the Orphan-

houſe at Halle, in Germany, poſſeſſes likewiſe a large manuſcript. In Sir Hans Sloane's library, was a manuſcript written in Pattanian characters; and a letter of a Nabob, two yards long, richly ornamented with gold. In the Britiſh Muſeum are ſeveral pieces of the exterior and interior bark of trees, written on; and many more are in other Britiſh libraries. In the gallery of the Grand Duke of Tuſcany, at Florence, in the 3d apartment and the 11th partition, are ſeveral writings on bark, but not ancient: but of the antiquity of a very great number of the like manuſcripts in the Vatican library, in Greek, Hebrew, Arabic, and Latin, there is not the leaſt doubt. To this ſucceeded the method of painting the letters with pencils, on linen and cotton:—whether theſe cloths were of the ſame kind as thoſe now in uſe, cannot be aſcertained. According to Symmachius, the prophecies of the Sybils were written on linen cloth. And Livy ſtates the ſame, of the annual regiſters of the Romans. But Pliny ſays, linen was only uſed for writing in private affairs, notwithſtanding, Livy and Claudian have proved the contrary; and in the Theodianian Codex (tit. xxvii. cap. 11.) is mentioned a law, written on *mappas linteas*. The Chineſe wrote two thouſand years ago, before they invented the art of making paper, on pieces of linen or ſilk, cut to ſuch a ſize as they wiſhed to have the book. It was not uſual for the Greeks to write on linen. Count Caylus remarks, that there were found, ſometimes in the boxes containing Egyptian mummies, very neat characters, written on linen. It ſeems natural, that all linen, uſed for writing, muſt have been ſteeped in ſize or gum, or the ink and paint muſt have blotted.

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Of the inhabitants of Partha, it is ſaid that they wrote upon the ſame ſtuff of which they made clothes. And ſome Indians write yet on a kind of cloth, named *Syndon*. But, as linen was too much ſubject to become mouldy, animals were then attacked, to furniſh ſtuff for a writing material:—their ſkins *(coria)* were principally uſed to write upon, after they had been tanned on both ſides: thoſe of ſheep, goats, and aſſes were preferred. Several books, written on theſe, were in the Vatican library; in that of the King of France; and in ſeveral others. In the convent of the Dominican monks at Bologna, are two books of Eſdras, written on aſſes ſkins, which are ſaid to be the original manuſcripts of Eſdras himſelf: but it is certain that it has been written only about five hundred years ago, and it looks like leather. This copy was given to the Prior Aymerico, of that convent, by a Jew, in the commencement of the fourteenth century.

The ancient Perſians and Ionians wrote on hides from which the hair was ſcraped. And the ſhepherds in former times wrote their ſongs with thorns and awls on ſtraps of leather, which they wound round their crooks.

The Icelanders ſcratched their *runes*, a kind of figurative writing, or hieroglyphic, ſometimes on walls: and it is noticed in the *Laxdaela Saga*, that Olof, at Hiardarhult, has built a large houſe, on the balks and ſpars of which he has got engraved the hiſtory of his own and more ancient times: and Thorkil Hake wrote his own deeds, in thoſe hieroglyphics, on his chair and bed. The moſt ancient *runes* are traced to the

third century; and the moſt ancient hiſtorian, who mentioned them, is Venantius Fortunatus, who lived in the ſixth century.* Of theſe letters, or hieroglyphics, there were no more than ſixteen in the whole; but as, in the year one thouſand, the Chriſtian faith was introduced in Iceland, they were found inſufficient, and Latin letters were adopted.

Puricelli maintains, that the Italian Kings, Hugo and Lotharis, had given a grant to the Ambroſian church, at Milan, written on the ſkin of a fiſh.

Not only the ſkins of animals were uſed for a writing ſubſtance, but alſo bones and entrails, if they were thought to be fit for that purpoſe. In the hiſtory of Mahomet, is ſlightly noticed, that the Arabians took the ſhoulder-bones of ſheep, on which they carved remarkable events with a knife; and, after tying them with a ſtring, they hung their chronicle in their cabinets.

In the library of the Egyptian King Ptolomœus Philadelphus, which is ſaid to have contained 700,000 volumes, were the works of Homer, written in golden letters on the ſkins of animals: and under the reign of the Emperor Baſiliſkus, was burned, at Conſtantinople, a manuſcript 120 feet long, written on the inteſtines of beaſts, &c. in golden letters, containing Homer's Iliad and Odyſſey. In the library of the Emperor Zeno Iſauricus were likewiſe Homer's works, painted

* He ſays in Carm. vii. 18, Barbara fraxineis pingatur *Runa* tabellis.

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in golden letters on the entrails of animals: and we know, from Iſodorus, that the inteſtines of elephants have been alſo uſed for writing.

But theſe writing-materials were not in general uſe, but were regarded as a rarity. There is in his Majeſty's library at Hanover a letter, engraved on a golden plate, written by an independant prince of the coaſt of Coromandel to King George the Second, which is about 3 feet long and 4 inches wide, and inlaid on both the narrow ſides with diamonds, which was delivered to the late Mr. Scheidt, to be kept in his Majeſty's library at Hanover.

We arrive now at the period when the Egyptian Paper was invented, and manufactured from the rind of the Paper-plant, *Papyrus*, which grows in the marſhes on the borders of the Nile, and is called in the Egyptian language *Berd*, or *al Berdi*. Theophraſtus, Pliny, Guilandin, Proſper Alpin, and other authors, deſcribe the Egyptian Paper-reed to be a plant of the ruſh kind, which grows in ſwamps about 10 cubits long. The ſtalk is triangular, and of a thickneſs to be ſpanned; ſurrounded, near the root, with ſhort leaves, but naked on the ſtalk. This ſtalk has on the top a buſh, which reſembles in ſome reſpects a head with hairs, or of long, thin, ſtraight fibres; the root is brown. After Pliny, Guilandin furniſhes us with the beſt deſcription of the *Papyrus*, and the method how it is prepared for the uſe of writing; all other ſubſequent authors have, more or leſs, copied them.

The Egyptian Paper-reed which according to Strabo grows only in Egypt and India, and of which in the year 79, after the birth of Chriſt, a ſpecies was found in the Euphrates near Babylon, which was equal in quality to the genuine Egyptian *Papyrus* for making Paper, muſt not be miſtaken, as Ray and others did, for the Papero-plant growing in Sicily, which much reſembles the other. Lobel has given a deſcription of the Sicilian Papero, in his *Adverſariis*, and it does not ſeem that it has been uſed in ancient time for making Paper: it is only lately that the Chevalier Savario Landolina has ſent ſamples of Paper to the ſociety at Gottingen, manufactured from this plant, according to the deſcription which Pliny has given of the manufacture of *Papyrus*.

Many authors believe that the Egyptian Paper-plant is no more exiſting, which does not ſeem likely, becauſe it was a plant in many reſpects of the ruſh kind; but by the changes which the ſoil in that country has experienced, it may have become ſcarcer. Nevertheleſs, it is not noticed by Pocock; and Shaw notices it only amongſt the hieroglyphics of the ancient Egyptians. Maillet obſerves (which ſeems to be improbable), *Je ſerais cependant aſſez porté à croire, que ce n'eſt autre choſe que la plante appellée au Caire* figuier d'Adam, *et par les Arabes* Mons. Moſt of the modern geographers, who deſcribe Egypt, take no notice of this plant, which may lead us to believe that they have either no knowledge thereof, or thought it no object of conſequence, but not that it exiſts no longer: and, as Pliny ſtates that *Papyrus* was not only

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uſed for making Paper, but for numerous other purpoſes, which he deſcribes, we muſt preſume that care would have been taken to preſerve ſuch an uſeful plant.

The Egyptian Paper was manufactured from the fine pellicles of the *Papyrus* which ſurrounded the trunk (the fineſt of which were in the middle), and not from the marrow of the plant. Theſe pellicles were ſeparated by means of a pin, or pointed muſcle ſhells, and ſpread on a table ſprinkled with Nile water, in ſuch a form as the ſize of the ſheets required, and waſhed over with hot glue-like Nile water. On the firſt layer of theſe ſkins, a ſecond was laid croſs-wiſe to finiſh the ſheet, *(Plagula)* which was preſſed, hung up to dry, and ſmoothed and poliſhed with a tooth. The Nile water was laid on with great care, to prevent ſpots in the Paper. Twenty ſkins were the utmoſt which could be ſeparated from one ſtalk, and thoſe neareſt to the pith made the fineſt Paper.

Twenty ſheets, glued together, were called *ſcapus*, but ſometimes ſeveral *ſcapi* were glued together, to form a large *volumen*. This part of the buſineſs was executed by the *Glutinatoris*, the work of whom reſembles in many reſpects that of the bookbinders in our time. All perſons who worked in theſe Paper-manufactures had names according to their work.

With reſpect to the time when this Paper was invented there are different opinions; and even the name of the inventor

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is unknown. Some authors have tried to prove its antiquity from Homer, Heſiod, and Herodotus, and conjectured that Moſes had written his books on Egyptian Paper, whereas Varro ſtates that the invention was not known in the time of Alexander the Great, which is about 400 years before the birth of Chriſt; but as Ariſtotle mentions the book-moths as well-known inſects, it ſeems likely that the invention is more ancient; and Pliny refutes Varro, by quoting Caſſius Hemina, who ſtates that a writer named Terentius, by digging a piece of land on the mountain Janiculum, found in a ſtone box the books of Numa, written on Egyptian Paper, which was completely preſerved, notwithſtanding it had been 350 years buried in the earth, becauſe it had been ſteeped in oil of cedar; and that Mucian, who was three times conſul, had aſſured him, that during the time he was commander-in-chief in Lycia, he had ſeen there, in a temple, a letter of the Lycian King, Sarpedon, written on Egyptian Paper. It is true Guilandin has proved that the Paper-reed was known long before the reign of Alexander the Great, which he ſtates was uſed for ſeveral purpoſes, but thereby cannot be poſitively aſcertained that it was uſed as Paper-ſtuff.

The Paper manufactured in Egypt was rather of an inferior quality, and the Romans prepared it more carefully, and paid more attention to the waſhing, beating, gluing, ſizing, and ſmoothing, than the Egyptians. They ſized it in a ſimilar method as we do rag-paper, but they made their ſize of the fineſt flour, which was ſtirred in boiling water with a few drops of vinegar and ſome leven, and then filtered. It was after the firſt

ſize beat with a hammer; ſized the ſecond time, preſſed, and then ſmoothed. This Paper of the Romans was very white, and, according to Pliny, never more than than 13 inches wide.

Pliny and Iſidorus have informed us that the Romans had ſeveral ſorts of Paper, to which they had given different names. Pliny mentions eight of theſe.

1. *Charta Hieratica*, of which were four different ſorts.

a. Charta Hieratica. This was a Paper not cleaned at all.

b. Charta Auguſta, (ſo called to pay reſpect to the Emperor Auguſtus) was improved by one cleaning.

c. Charta Liviana (named after the Empreſs) which was rendered ſuperior by a ſecond cleaning.

d. Charta Hieratica. This name was likewiſe given to Paper in full perfection.

The Romans named theſe four aſſortments in general *Charta Hieratica*, or Holy Paper, becauſe it was principally uſed for ſacred books and writings. All was 11 inches wide.

The *Charta Auguſta* had at firſt the preference, but being too thin for the writing-cane, in the 50th year after Chriſt, under

the reign of the Emperor Claudius, it was improved by lining the Auguſtan Paper with an underlaying of the ſame Paper, which gave the name to

2. *Charta Claudia.* This Paper was better than *Charta Auguſta,* and 2 inches wider. I muſt obſerve, that all books preſerved in the *Herculaneum* are written on Paper not underlayed; and that the firſt Paper was only written on one ſide. The *Adverſaria,* of which Pliny the elder left 160 volumes, were the only books preſerved in which the leaves were written on both ſides, two leaves being paſted together. It is ſaid that Julius Cæſar was the firſt who wrote *opiſtographically,* but only when he wrote letters to confidential friends.

3. *Charta Fannia. Palæmon,* a celebrated grammarian, had in the year 5, ſeveral public work-ſhops, in which this Paper was prepared with more ſkill: it was uſually uſed for writing plays upon. It was 10 inches wide, and glazed with a tooth, ivory, or muſcle-ſhells.

4. *Charta Amphitheatrica,* which was much coarſer than the before-mentioned ſorts, and only 9 inches wide.

5. *Charta Saitica,* which was only made in the city of Said, Salo, or Sahid, from the cuttings or ſhavings, and refuſe of other Paper, which was gathered throughout the country, and re-manufactured in this city: it was not full 9 inches wide.

6. *Charta*

6. *Charta Tanitica*, which obtained that appellation from the city of Tanic, now Damietta.

7. *Charta Emporetica*, or ſhop-keepers' Paper, which was uſed to wrap goods in, was manufactured from the next pellicle under the rind of the Papyrus, and ſold by weight: but, being only 6 inches wide, it was found to be inconvenient for covering and packing of goods. It has been called by ſome *Leneotica*.

8. *Charta Macrocolla*, or only *Macrocollum*. It received its name from its large ſize.

Several authors mention other ſorts: *Charta Libyana*, *Charta Thebaica*, *Charta Carica*, *Charta Memphitica*, *Charta Corneliana*, after Cornelius Gallus, who was the firſt that had this Paper manufactured. *Mellonis Pagina*; *Charta Blanca*; it obtained its name from its beautiful whiteneſs: this name is yet applied to a blank ſheet of Paper, which is only ſigned. *Charta Nigra* was the name of Paper painted black, and the letters written thereupon were of white and other colours.

The Egyptian Paper was manufactured in Alexandria and other Egyptian cities, in ſuch large quantities, that Vopiſcus ſpeaks of Fermies having boaſted, that he poſſeſſed ſo much Paper, that its value would maintain a large army for a long time. Alexandria was for a conſiderable time ſolely in poſſeſſion of this manufacture, and acquired immenſe riches, which was noticed by the Emperor Adrian. At the end of the 13th century

tury the commerce with Egyptian Paper was ſtill flouriſhing, and continued to the 5th century, notwithſtanding the high impoſts thereon, which induced King Theodoric, *after theſe impoſts were*, at the latter end of the 5th century, *greatly encreaſed*, to deliver Italy therefrom at the commencement of the 6th century. Caſſiodorus wrote on that ſubject a very remarkable letter (the 38th letter in his 11th book) congratulating the whole world on the ceſſation of an impoſt on an article of commerce, ſo neceſſary for the convenience and improvement of mankind.

It was uſed occaſionally in Italy until the 11th century, but not generally, by reaſon of its laborious, difficult, and expenſive manufacture, and that the uſe of Parchment and Paper made of cotton became gradually introduced. Several authors differ again in ſtating the exact period when the uſe of Egyptian Paper was dropt; but this difference may originate from miſtaking the Paper made of Papyrus for that of the bark of trees, which was even continued to be uſed in the 12th century, and ſhall be mentioned hereafter.

Some of that Paper is preſerved to the preſent time. It was already known in France in the 5th and 6th centuries. Mabillon quotes ſeveral acts ſtill exiſting, written on Paper manufactured from the Papyrus, by the Kings Childebert the Firſt and Clodovic the younger; and Gregorius Turonenſis affirms in his letters, that it was generally uſed at an early period in the French Chancery. In the Abbey of St. Germain des Prez, at Paris, was a complete work written on Egyptian Paper. In

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the Royal Library at Paris was the *Charta plenariæ poteſtatis*, written on the ſame Paper. And Mabillon remarks that ſeveral ſuch manuſcripts, written in the 6th century, were in the Library of Mr. Petau.

In the Cottonian Library are four leaves of this Paper, on which the goſpel of St. Matthew and St. John are written.

Italy can produce ſeveral explanations of the Pſalms, manuſcripts of the Fathers of the Church, Public Acts, &c. written on Egyptian Paper: amongſt them I muſt notice a ſcarce relic of the treaſury of St. Mark, at Venice, which is the goſpel of St. Mark, written by himſelf, of which ſome leaves have been conveyed to Prague, by the Emperor Charles IV. It is kept with great veneration and care in a ſilver caſe gilt, which is in the form of a book, and conſidered to be the moſt precious piece of the whole treaſury, notwithſtanding no perſon is able to diſtinguiſh a ſingle letter, being ſo much injured by time, that it tumbled to aſhes when only touched. Zanetti diſcovered in the cabinet of Mr. Nani, a diploma of Papyrus, a Venetian ell long, and half an ell wide. And lately was found, in the archives at Florence, a document which is apparently written between the years of 454 and 469, of ſix feet by two; many others are exiſting in Italy, too numerous to ſpecify.

Amongſt the ſeveral documents written on Egyptian Paper, at Vienna, is a diploma of Pope Benedict III. of 21 feet by 2: and a document in Latin, which is entirely preſerved. The record of Ottokar, King of Bohemia, is likewiſe written on Egyptian Paper.

In the Electoral Library at Munich, is a manuſcript on reed; and in the Library at St. Gall in Switzerland, is a Codex of this Paper, on 30 leaves in quarto, written in the 7th century, with *Uncial* letters, containing the *Homilias St. Auguſtini et Iſidori.* In the Library at Geneva are two manuſcripts, according to Mabillon and Montfaucon, of the 4th and 5th century. I could quote many more remains of Egyptian Paper, noticed by Mabillon, Vacchieri, Gerkens, Lambecius, and other authors; and other manuſcripts lately diſcovered by ſcientific travellers; but, as it would extend this account beyond my intended limits, I ſhall now turn to another Paper-material, which is more ancient than the Paper of Papyrus.

Charta Corticea, or Paper of the Bark of Trees, manufactured of the *membrana ligni tenuiori*, and likewiſe uſed for writing, is difficult to be diſtinguiſhed from the Egyptian ſhrub-paper, called *Charta papyracea ex pelliculis herbæ Ægyptiacæ*, and therefore often conſidered to be the ſame; and ſeveral authors deny it ever to have exiſted. But if they had carefully examined theſe two ſorts, they would have diſcovered their error, and the difference.

The *Charta Corticea* has been, as aforeſaid, made of the fine ſkinny ſubſtance ſeparated from the interior ſide of the bark of ſuch trees as were fit for that purpoſe, which has been moſt likely formed into Paper by waſhing, beating, and plaining, like the Paper of Papyrus. But it had always three or four couches, which were glued together, and was therefore through its thickneſs not only more brittle, but the united pellicles often ſeparated; principally the upper couch which was written on,

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and the writing became, therefore indiſtinct and uſeleſs. The *Codices* of *Charta Corticea* are for the major part written in Latin, which gives us reaſon to ſuppoſe, that it was uſed principally in the weſtern countries, where the Egyptian Paper could not be obtained, or was very expenſive, and the inhabitants were therefore obliged to try to make their own paper. All ancient documents in Germany which are not written on parchment are in general on Paper made of ſilk, wool, and the bark of trees; but theſe on Paper made from Papyrus are ſcarce, and an experienced eye is only able to diſtinguiſh one from the other. In the Abbey of St. Germain is one, the upper couch of which has diſappeared with the letters. In the archives of the church at Gironne are preſerved the bulls of the Popes Romanus and Formoſus, of the years 891 and 895. They are about ſix feet long, and three feet wide, and are apparently formed by gluing the ſkins or leaves couchwiſe one to the other; and the writing remains legible in different places. The uſe of this Paper continued in France till the 12th century.

That, in the moſt ancient times, ſkins and hides of animals have been uſed as a writing material I have before ſtated. In more modern times the ſkin between the hide and the fleſh was ſeparated, ſcraped, and by working and rubbing with quicklime, were formed into leaves, and called *Membrana*. They were uſed by the Hebrews and Greeks; and the Jews maintain that their anceſtors uſed them for writing on the Mountain of Sinai. It is certain that the Jews had at the time of David, books of the ſkin of animals rolled up called *Mgilloth*; and Herodotus aſſures us, that in remote

times

times the ſkins of ſheep and goats were the uſual writing materials about 440 years before Chriſt. That the ancients have uſed ſkins of different animals for that purpoſe is apparent, by the words, *Membrana caprina, agnina, ovilla, vitulina, et hædina,* which are found in ſeveral authors.

But ſuch membranes are very different from the true parchment, *Chartam Pergamenam.*

Ptolomæus the Firſt,* King of Egypt, who died in the year of Rome 470, eſtabliſhed in Alexandria, a very extenſive library, which was much enlarged by his ſon Ptolomæus Philadelphus, with the aſſiſtance of his librarian Demetrius Phalereus. Eumenes, King of Pergamus, contended with, and endeavoured to ſurpaſs him if poſſible, which created jealouſy, and cauſed Ptolomæus to prohibit the exportation of Egyptian Paper, under heavy penalties. It may be that this prohibition was not ſolely occaſioned by jealouſy, but from the fear that his dominions, which were ſo much improved in arts, ſciences, and civilization, ſince the diſcovery of Paper, would be again reduced to a ſtate of ignorance for want of Paper, becauſe the plant failed ſometimes in unfavourable weather. The Pergamians were therefore obliged to deviſe other means for making Paper, and they diſcovered the manufacture of uſeful parchment, about 300 years before Chriſt, and in the 5th century of Rome, which obtained its name from the city of Pergam, or Pergamus, in Aſia (now Pergamo), the place where it was invented, and the art of bringing it to ſuch a ſtate of

* Sometimes named *Soter* and *Lagus.*

perfection,

perfection, that according to Prideaux and Freret, it greatly ſurpaſſed the Egyptian Paper in fineneſs, ſmoothneſs, and ſtrength; and the art of making it very thin arrived in a ſhort time to a ſurprizing degree of perfection. Rome manufactured the beſt parchment. The firſt inventor could only manufacture yellow parchment; yet in Rome it was ſoon improved, and made white: but as that delicate colour was too liable to tarniſh and ſpot, it was only made white on one ſide, and the other left yellow; and if it was to be uſed for writing on both ſides, it was coloured violet and purple, and the letters were written thereon in gold or ſilver. Gold was only uſed for ſacred writings, and principally for the Pſalms and Goſpel.

All the world at that time did not uſe Paper and Parchment alone for writing upon, but ſtones and metals; the laſt was chiefly uſed on account of its durability, and all nations had not attained a knowledge of the uſeful inventions of the Egyptians and Pergamians. Parchment came into uſe in Europe not before the 6th century, which increaſed in the 8th and 9th; and England and Germany made very little uſe of Egyptian Paper for diplomas, but parchment, till the year 1280. I am informed that before the invention of Rag-paper, nothing elſe was uſed in Germany for diplomas than parchment; and, notwithſtanding, no map of parchment made before the 6th century has been diſcovered.

With reſpect to the ſize, length, and width of the parchment, it was not regulated like the Egyptian Paper, and there are documents as ſmall as our playing-cards. There was likewiſe

no adopted rule, if written at length or at the ſides; it depended on every one's fancy: but as it commonly was uſed only on one ſide, it was more generally written ſidewiſe than lengthwiſe, to ſave ſpace. When printing was invented, parchment was likewiſe printed upon; and at Berlin, Brunſwic, Paris, and St. Blaiſe,* are copies of a bible, printed in the year 1450, on parchment, in three folio volumes. At the Univerſity library at Helmſtadt is the *Officia Ciceronis:* and from the library of the late Mr. von Duve was ſold, by public auction, the very ſcarce work, printed on parchment, *Chronica Figurata totius mundi a Hartm. Schedelio, Doct. Norimb.* of Anton. Koberger, printed in folio, 1493, with copper-plates.

Parchment ſhould be only made of calf-ſkins, to be entitled to its name; but it is in modern times likewiſe made of the ſkins of ſheep, goats, aſſes, and hogs. I ſhall not enter into a deſcription of the manufacture of parchment, or repeat the various ways in which it is uſed, new or old, but only obſerve that in France there is annually the value of upwards of a million of livres of parchment manufactured.

I ſhall now continue my hiſtorical account, and obſerve, that it is erroneous to ſtate that the Arabs invented, in the 8th century, the manufacture of Paper from cotton: and Caſiri, who ſtates it to have been diſcovered in the year 706, by Joſeph Amra, cannot deny that it was known before

* An Abbey of the Benedictines, in the Black Foreſt, in the Biſhopric of Conſtance. The Abbot is a Prince of the German Empire.

that time by the Chineſe and Perſians. The Arabians are therefore not the inventors, and acquired the knowledge of making it only in 704, by their conqueſts in Tartary. This invention became then more generally known, but the art of manufacturing it was only imported in the 11th century into Europe; and neither is the year of its diſcovery preciſely known, nor the inventor's name. The firſt paper of that kind was made of raw cotton;* but its manufacture was by the Arabians extended to old worn-out cotton, and even to the ſmalleſt pieces thereof.

But as there are cotton-plants of various kinds, it is natural that theſe muſt have produced papers of different qualities; and it was impoſſible to unite their woolly particles ſo firmly as to form a ſtrong ſubſtantial Paper, for want of ſufficient ſkill; and alſo for want of European mills (which are not yet eſtabliſhed by the Moors, Arabs, and Turks, who make uſe of mortars, and hand and horſe-mills), it was impoſſible they could bring their wool, by that method, and by boiling and

* This muſt have been unknown to *Guetard*, or he would not have ſtated that he was the firſt who had aſcertained by experiment, that raw cotton-wool could be converted into Paper, without being previouſly uſed for clothing, or other purpoſes. It ſeems he has been miſled by the Jeſuit *du Halde*, who ſays that the Chineſe made their Paper from cotton-rags. *Guetard* alſo aſſerts, that he was induced to make his experiments, becauſe he had not found an author who mentioned the practicability of making Paper from cotton-wool; and that by beating it to a pulp he has made fine white Paper of it. But if he had read *Theophilus Preſbyter* and *Monachus*, he would have been informed that in the Eaſtern countries it was cuſtomary to make Paper of cotton-wool.

beating,

beating, to a fine pulp rendered intirely free from its woolly quality. Not diſcovering in ſuch ancient cotton-paper, ſtripes or water-marks, or the prints of wire reſembling thoſe of our moulds, we muſt preſume that their forms were not like our ſkilfully invented moulds, through which the water runs off, and the maſs remains therein united.

The Chriſtian diſciples of Mooriſh paper-makers, who ſince 1085, were in poſſeſſion of Toledo, and in 1238, of Valencia, worked the paper-mills to more advantage than their predeceſſors: inſtead of manufacturing Paper of cotton-wool (which is eaſily recognized by its being brittle and remaining always yellow), they made it of cotton-rags, in moulds through which the water ran off: for this reaſon it was called parchment-cloth. Beſide theſe denominations, the hiſtorians of that time call it *Charta Xylina*, or *Goſſypina*, from the cotton-plant; *Charta Bombycina*, from the ſhrub *Bombax*, by which name it was likewiſe deſcribed in England; *Charta Cotonea; Charta Damaſcena;* and *Charta Serica*.

All civilized nations uſed firſt the Egyptian and then the cotton-paper, but had not any idea of uſing linen for the ſame purpoſe; and to this day the Eaſtern nations who manufacture their own Paper, and even the Greeks, employ only cotton-wool and cloth for that uſe; and are ſo much accuſtomed to ſtrongly glazed Paper, that when they receive Rag-paper from Italy and the ſouth of France, they glaze it till it reſembles our gloſſy linen cloth.

It is probable that the Greeks made uſe of cotton-paper ſooner than the Latins; and that it was brought into Europe by the Greeks, earlier than by the Moors from Spain, there is no doubt. The Greeks received it from the Tartarian countries at the Bukarias; and through Venice it came into Germany, where it was known in the 9th century by the name of Greek parchment. Greece, ſo much connected by commerce with Aſia and Egypt; Italy, which was already in the 7th century frequented by the Arabs; Spain, which they conquered in the 8th century, and poſſeſſed to the latter end of the 15th; were, without contradiction, the European countries where cotton-paper was firſt uſed. The Arabs manufactured, at Cebta (which is, according to Manjanſius, now Ceuta), a cotton-paper, called Cebti; and Spain being ſo near, could eaſily have been provided with it, until manufactories were ſhortly after eſtabliſhed at Xativa, Valencia, and Toledo.

The ſtuff for this paper, cotton, was moſt likely cultivated in Spain by the people who had conquered it, becauſe they came from a country where it was in general uſe, and they were therefore accuſtomed to it. There is yet more than one quality of cotton found in Spain, and that commodity is conſidered in the Kingdom of Valencia as a home production; and it is not unlikely that the predeceſſors of the Arabs, (the Phœnicians and Carthaginians,) introduced it into Spain. Swinburne calculates the produce of cotton, the growth of Valencia, at 450,000 arobes, value 350,000*l.* which is in ſome meaſure confirmed by Twiſs, who ſaw,

between Cordova and Granada, ſeveral fields full of cotton-plants.*

The paper-manufactories at Xativa, Valencia, and Toledo, produced only very coarſe cotton-paper till the Moors were driven from Spain, either by the Arabians or Chriſtians. The Spaniards being acquainted with the uſe of water-mills, improved the method of grinding the cotton-wool and rags; and by ſtamping the latter in the mill, they produced a better pulp than the wool from which various ſorts of Paper were manufactured, nearly equal to thoſe made of linen-rags.

Spain ſtill poſſeſſes reſidues of cotton-paper. At the convent of Silos, is a Latin vocabulary, of intermixed parchment and thick cotton-paper leaves, written in *Gothic* characters, the date of which muſt have been prior to the reign of Alphonſus VI. as the uſe of *Gothic* writing was forbidden in 1129 at the council at Leon. As very few manuſcripts are found on cotton-paper from the 10th to the 12th century, but the major part on parchment, or intermixed, it muſt be ſuppoſed that at that time cotton-paper was ſcarcer than parchment, or that this mixture was neceſſary becauſe ſufficient parchment could not be obtained, and that the cotton-paper was too tender and more liable to break.

* Dillon, in his Travels through Spain, mentions cotton as a national production, and it is ſurpriſing that *Ulloa*, a Spaniard, in his *Retabliſſement des Manufactures et du Commerce de l'Eſpagne*, has omitted the mentioning of cotton.

The Arabian author, Scherif al Edriſſi, certifies that in 1151 very fine white cotton-paper was manufactured; and Cacim Aben Hegi aſſures us that the beſt was made at Xativa.

The King, Peter II. of Valencia (or the fourth King of Arragon) iſſued, in 1338, a command to the paper-makers at Valencia and Xativa, under pain of puniſhment, to manufacture better Paper, which was to be equal to that formerly made. Mr. Meerman had in his poſſeſſion a piece of very coarſe cotton-paper written upon in 1339, which proves that the art of paper-making was neglected by the Spaniards; and that prior to the middle of the 14th century no linen-rag Paper had been manufactured in that country. This has been fully aſcertained by the above gentleman, from the repeated examination of ſeveral pieces of Paper ſent to him for that purpoſe. Notwithſtanding, their ſcientific men perſiſt in its being linen-paper.

Cotton-paper came into uſe in France ſhortly after its invention; and until 1311, no other Paper than this and the Egyptian Paper was known in that country.

At what period cotton-paper was introduced into England cannot be aſcertained with accuracy. The moſt ancient manuſcript which can be produced is of 1049: and it appears that its uſe continued till the latter end of the 14th century, and that it has been gradually ſupplanted by the linen-paper, which came into uſe in 1342. All documents written between

tween 1282 and 1347, which Ducarell erroneouſly ſtates to be linen-paper, are written on cotton-paper, as is the *Carmina aurea Salomonis Regis*, in *His Majeſty's* library, compoſed in the 14th century, in the Greek and Latin languages; at leaſt there is no reaſon to doubt what Mr. Meerman ſtates on this ſubject.

Of the introduction of cotton and linen Paper in Scotland, nothing can be aſcertained; and it is ſingular that it has not been noticed by Thomas Ruddiman. The ſame is the caſe with Ireland. But diſcoveries may yet be made in theſe countries.

The knowledge of cotton-paper came by means of the Greeks to Italy; and the art of making it, in Sicily, through the invaſion of the Saracens. It is certain there was no linen-paper uſed before 1367.

The bulls of the Popes Sergius II. John XIII. and Agapetus II. were written in the 8th and 9th centuries, on cotton-paper. Dufreſne quotes under the article *Charta Cuttunea*, from *Rocchi Pyrrhi Sicilia Sacra*, a place where the family of a paper-maker is mentioned, but no time is noticed, notwithſtanding a full account is given of a cotton-paper manufacture which we have not of any other country.

The large paper-manufacture at Fabriano, in the *Marchia Anconitana* (which, according to Bartolus's deſcription, conſiſted of ſeveral different mills belonging to different perſons, although

although the whole formed only one manufacture), was eſtabliſhed long ago, but was enlarged from time to time, and manufactured, at the period when Bartolus wrote, nothing but cotton-paper. This author died in 1355; ſo that it ſeems that 1367, or thereabouts, was the time when linen-paper was brought into uſe in Italy: and cotton might have been ſome time before mixed with linen-rags, till the ſuperiority of the latter was fully aſcertained.

As ſoon as the uſe of cotton-paper was adopted in Italy, it was alſo introduced into Germany; and, at the commencement of the 9th century, well known under the name of Greek parchment. Germany imported the Paper ſome time before it manufactured it; and notwithſtanding it received the ſtuff through the ſame channel as the Paper, and that cotton and flax were ſpun and wove in the 10th century, the manufacture of cotton-paper cannot be traced in Germany to ſuch an early period: all that can be poſitively aſcertained is, that in the middle of the 14th century, it was made by ſtamping-mills. But as Germany had in the 13th century, already cotton and linen manufactures, and exported conſiderable quantities thereof to Italy, it is fair to preſume that cotton paper was alſo manufactured.

I now conclude the hiſtorical account of the ſeveral ſubſtances which have been uſed as writing materials, with the invention of linen Paper.

The Royal Society of Sciences, at Gottingen, has, in the years 1755 and 1763, offered premiums to trace the exact time of this diſcovery; and Mr. Meerman printed in 1762 at Rotterdam, *Gerardi Meerman, Syndici Roterodamenſis, Admonitio de Chartæ noſtratis, ſeu lineæ, origine,* and offered 25 ducats to find it out. All reſearches were loſt and reduced to an uncertainty through the cotton Paper, which was in uſe ſome centuries before the linen Paper, becauſe theſe two are in many reſpects ſimilar, and cotton and linen rags may have been at firſt mixed, which rendered it therefore difficult to aſcertain when the firſt Paper was made from linen rags alone.

The Jeſuit Du Halde attributes this invention to the Chineſe; but as Gerbillon, and other modern travellers aſſure us that in the Paper-manufacture at Ming-hya, raw hemp was beaten and macerated with drugs, and then manufactured into Paper, this nation cannot claim the diſcovery of the art of making Paper from linen rags; and all authors agree that Europe is entitled to the merit of this invention, but they differ as to the time; ſome trace it to the 8th, 10th, and others to the 11th and 12th century; and it is moſt likely that Paper has been made from linen cloth before it was attempted to be made from linen rags.

Gregorius Manjanſius, of Oliva; Franciſcus Perez, of Toledo; and Ferdinando Velaſco, of Madrid, endeavoured to trace this diſcovery in Spain, but could not prove that their country was entitled to the merit of it, being completely defeated by a number

ber of other authors; and it ſeems that the Spaniards had no knowledge of linen Paper before the middle of the 14th century, and then it was not manufactured in that country, but imported; and it is moſt likely linen and linen-rag Paper were only manufactured in Spain a ſhort time before the art of printing was introduced. Spain cannot therefore claim the merit of this invention; and ſoon after that they manufactured Paper from linen rags, theſe manufactories went to decay, becauſe the Kings of Spain firſt granted monopolizing privileges to many convents for the manufacture of Paper; and when it came again into private hands, they fixed ſuch a low price on printed books, of which the Genoeſe availed themſelves, and procured conſiderable quantities of rags from Spain, principally from Andaluſia; and in 1720, they ſend Paper back to Spain to the amount of 500,000 piaſters. There are at preſent upwards of 200 Paper-mills in Spain, 31 of which are at Alcoi, and Franciſco Guarro manufactures Paper as good as any Dutch.

France made an early uſe of linen Paper, but manufactures were later eſtabliſhed there than in Spain and Italy. Lint or flax, was cultivated by the Gauls at an early period; but the clothing with linen became only a cuſtom many centuries afterwards; and the authors of the 8th century quote as a remarkable thing that the holy Segolena was dreſſed in a linen ſhift, and that the Queen of France, wife of Charles the Seventh, was the firſt French Queen who wore ſhifts of linen cloth; which was in the 15th century. This is not a proof that no Paper was made of linen before that time. Several authors prove the uſe of linen Paper in 1270, 1294,

1320,

1302, 1314, and 1316, but not that it has been manufactured in France, and we have no account for ſeveral centuries what kind of linen Paper was made, which the authors would not have left unnoticed; and therefore no Paper manufacture can be traced before the 15th century. Theſe manufactures became in a ſhort time very flouriſhing, and the French ſoon exceeded their neighbours in the art of making Paper, and were therefore enabled to export conſiderable quantities, which encreaſed ſo much yearly, that in 1658, of 35 millions of livres exported in goods and merchandize to Holland, two millions in value were of Paper; and it provided Spain, England, Switzerland, Denmark, Sweden, Ruſſia, but chiefly Holland and the Levant, with Paper for printing and writing, The Paper manufactures in Languedoc, Lioneſe, Guienne, Bretagne, and Poitou work principally for exportation; and the 14 mills in Alſace, which manufacture about 40,000 reams of Paper annually, export two-thirds thereof to Switzerland and Germany.

As the French ſtill export a conſiderable quantity of Paper, I think it worthy of notice to ſtate the names, length, width, and weight of all the different ſorts of Paper, now manufactured in France.

Names.	Length. In. Lines	Width.	A Ream ſhould weigh.	And at leaſt.
Grand Aigle	24 9	36 6	131lb. and upwards	126lb.
Grand Soleil	24 10	36 0	112lb. not exceeding 120lb	105
Au Soleil	20 4	29 6	86 and upwards	80
Grand Fleur de Lis	22 0	31 0	70 not exceeding 74	66
Grand Colombier ou Imperial	21 3	31 9	88 and upwards	84
A l'Elephant	24 0	30 0	85 ditto	80
Chapelet	21 6	30 0	66 ditto	60
Petit Chapelet	20 3	29 0	60 ditto	55
Grand Atlas	24 6	26 6	70 ditto	65
Petit Atlas	22 9	26 4	65 ditto	60
Grand Jeſus ou Super Royal	19 6	26 0	53 ditto	48
Grand Royal etranger . . .	18 0	25 0	50 ditto	47
Petite Fleur de Lis	19 0	24 0	36 ditto	33
Grand Lombard	20 0	24 6	36 not exceeding 40	32
Grand Royal	17 10	22 8	32 and upwards	29
Royal	16 0	22 0	30 ditto	28
Petit Royal	16 0	20 0	22 ditto	20
Grand Raiſin	17 0	22 8	29 ditto	25
Lombard	18 0	21 4	24 ditto	22
Lombard ordinaire	16 6	20 6	22 ditto	20
Cavalier	16 2	19 6	16 ditto	15
Petit Cavalier	15 2	17 6	15 ditto	14
Double Cloche	14 6	21 6	18 ditto	16
Grande Licorne à la Cloche	12 0	19 6	12 ditto	11
à la Cloche	10 9	14 6	9 ditto	8
Carré, ou Grand Compte, ou Sabre, Sabre au lion	15 6	20 0	18 ditto	16
Carré très mince	15 6	20 0	13 ditto	13
A l'écu, ou moyen compte, Compte ou Pomponne,	14 0	19 0	20 ditto	15
à l'écu très mince	14 2	19 0	11 ditto	11
Au Coutelas	14 2	19 0	17 ditto	16

Names.	Length.	Width.	A Ream ſhould weigh.	And at leaſt.
	In. Lines.			
Grand Meſſel	15 0	19 0	15 and upwards	14
Second Meſſel	14 0	17 6	12 ditto	11
à l'étoile, à l'éperon, ou longuet	13 10	18 6	14 ditto	13
Grand Cornet	13 6	17 9	12 not exceeding 14	10
Grand Cornet très mince . .	13 6	17 9	8 and leſs	—
Champy, ou Baſtard	13 2	16 11	12 and upwards	11
à la Main	13 6	20 3	13 ditto	12
Couronne, ou Griffon . . .	13 0	17 1	12 ditto	10
Couronne, ou Griffon très mince	13 0	17 1	7 and leſs	—
Telliere grand Format . . .	13 2	17 4	12 and upwards	10
Cadran	12 8	15 3	11 ditto	10
La Telliere	12 8	16 0	12½ ditto	11½
Pantalon	12 6	16 0	11 ditto	10
Petit Raiſin, ou Bâton Royal, ou Petit Cornet à la grande ſorte	12 0	16 0	9 or leſs	8
Les trois O ou trois ronds, ou Genes	11 6	16 0	9 and upwards	8½
Petit nom de Jeſus	11 0	15 1	7½ ditto	7
Aux armes d'Amſterdam Pro Patria ou Libertas	12 1	15 6	12 to 13	12
Cartier grand Format, Dauphine	13 6	16 0	14 and upwards	12
Cartier grand Format . . .	12 6	16 0	13 ditto	12
Cartier	11 6	15 1	11 ditto	10
Au Pot, ou Cartier ordinaire	11 6	14 6	10 ditto	9
Pigeon, ou Romaine . . .	10 4	15 2	10 ditto	8½
Eſpagnol	11 6	14 6	9 ditto	8
Le Lis	11 6	14 1	9 ditto	8
Petit à la Main, ou Main Fleurie	10 8	13 8	8 ditto	7½
Petit Jeſus	9 6	13 3	6 ditto	5½

All ſorts which are leſs than 9 inches and 6 lines in length, are permitted to be made of ſuch a width as may be required.

That Paper called *Trace*, *Treſſe*, *Etreſſe*, or *Main-brune*, and of the names *Brouillard*, and *à la Demoiſelle*, and all coloured Papers may be manufactured of ſuch length, width, and weight as ordered.

There are three ſorts of French Paper which are exported to the Levant, that are not above deſcribed:

	Inches.		Inches.		
Aux trois Croiſſans, Façon de Veniſe,	12½	0 long,	17	0 wide	20lb. 0 oz.
Aux trois Croiſſans, ou trois lunes,	12	0	16	0	14 10
Croiſette	11	6 lines,	15	5 lines	9 4

The Papers called *Couronne*, *Cartier*, and *à la Cloche*, if deſigned for the Levant trade, differ from the before-mentioned ſize and weight. In *Savary's Dictionnaire Univerſel de Commerce* are mentioned twenty different ſorts of common Paper, made out of old nets and cords, maculated and blotting Paper, to which the French have likewiſe given different names, but I have omitted them, as they do not contribute to the knowledge of the commerce with Paper, nor to improve and extend our manufactures, which was the motive I had for giving here ſo long a detail; whereas I have endeavoured to abbreviate this hiſtorical account, in other reſpects, as much as poſſible. I will now continue to deſcribe the remaining ſorts of Paper manufactured in France.

Demoiſelle mince is made of the fineſt threads of nets, and being more ſtamped in the mill, loſes its natural colour, and becomes of a cinnamon colour.

Demoiſelle forte is leſs ſtamped, and of a dark brown colour.

Joſeph Raiſin, and *Quarré Muſe*, are made of coarſer nets and cords, which are not ſtamped fine. Theſe two ſorts are uſed for packing up the linen cloth at St. Quentin, Beauvois, and Troyes, becauſe their dark brown colour ſets off the whiteneſs of the cloth; and it ſeems that the manufacturers put ſome lamp-black in the engine, to darken the colour.

The Paper, called *Papier à Sacs*, is made of the coarſeſt rags, and is ſold by weight; it is ſurpriſingly brittle, and the manufacturers are therefore ſuſpected of mixing it with ſomething to encreaſe the weight, or it could not be ſo tender.

At the latter end of the laſt century the art of making Paper arrived to a great degree of perfection in England and Holland, ſo that the ſale in France has not ſince been ſo extenſive, and many Paper-mills have been ſhut up, or converted to other purpoſes. There were, a century ago, in the provinces of Perigord and Angoumois 400 Paper-mills, and now there are not one hundred remaining. But the exportation of Paper from France remains nevertheleſs very conſiderable; and it

ſtill

ſtill manufactures, after England and Germany, the largeſt quantity of Paper of any country in Europe. It exports very large quantities of all ſorts, chiefly that manufactured for Paper-hangings, to the United Provinces of America, for which reaſon, on the 29th of December, 1787, the exportation-duty was not only taken off, but alſo the exciſe returned. At Montargis is the largeſt Paper-mill, erected to work with 30 vats, which would conſume 1,620,000lb. of rags, and 135,000lb. of ſize, but want of water, and the quality thereof, has prevented its working to its full extent. At Vougeot, in Burgundy, is another large mill, with 12 engines and 20 vats, erected by Mr. Deſventes, of which Mr. De Lalande has furniſhed the public with a complete deſcription, and the drawings of all its parts and machineries.

In France are ſtill upwards of 500 Paper-mills, which conſume annually 20,000,000 weight of rags and coarſe paper ſtuff. In Franche-Comte it was aſcertained by the exchequer, that 16,000 cwt. of rags were collected within one year, of which 8,000 were manufactured in that county, and 8,000 exported to other counties: as Franche-Comte is only about $\frac{1}{20}$ part of France, 320,000 cwt. of rags muſt be annually collected in that country, and upwards of one-third, or 14,000,000 weight are ſtill exported, notwithſtanding the ſevere prohibition.

The time when linen Paper came into uſe in Italy remains likewiſe uncertain; and as all that has come to the

knowledge of the preſent time, cannot be ſatisfactorily proved, I will therefore quote only that which may be regarded as certain. The ſenate of Venice granted, in 1366, an excluſive privilege to the Paper-mill at Treviſo, that no paper-ſhavings ſhould be exported, than for the uſe of that mill; if now ſhavings from linen Paper exiſted, it proves the manufacture of that Paper; a document of a notary, in 1367, proves likewiſe the uſe of linen Paper; Maffei ſtates, that he is in poſſeſſion of a family manuſcript of linen Paper, written in 1367, and he attempts therefore to appropriate the invention of linen Paper to Italy. In 1374 the patent of the manufacture at Treviſo, which proved ſucceſsful, was renewed by the ſenate of Venice. An excluſive commerce in Paper was carried on at Venice, and the city of Gorlitz received, from 1376 to 1426, all her Paper from that country.

Angelus Roccha mentions a Paper manufacture at Foligni, in the 16th century; and he ſays, that at Fabriano was manufactured the beſt large Paper; and at Foligni, the beſt Paper of a ſmall ſize. The Paper-mills at Fabriano are yet in eſteem, and there are the greateſt number in Italy. In the Pope's territory, at Tivoli, Viterbo, Ronciglione, Bracciano, and Rome, are many Paper-mills, but they do not make as much Paper as they might, from the quantity of rags gathered in that country; and Schlozer ſtates, that one million in weight is annually exported to Genoa. The value is entered at 100,000 ſcudi, or crowns.

Venice exports large quantities of Paper to the Levant,* and to the Auſtrian dominions: at Colli, in Tuſcany, is a mill which manufactures very good Paper. In the environs of Turin are ſeveral mills which furniſh fine Paper; one Paper-maker in Venice is in poſſeſſion of the ſecret of covering his Paper with a varniſh, by which means the writings can be eaſily obliterated with a ſponge, and he has found an extenſive ſale for this Paper. The Genoeſe had ſome time ago monopolized the Paper-trade of Italy, by manufacturing it of a ſuperior quality and whiteneſs, and by uſing a particular ſize, which it is ſaid prevented its deſtruction by moths; but this commerce is now greatly reduced.

* The commerce with Paper to Turkey is principally carried on by Venice: the aſſortments are white, thick, and very cloſe; the Turks cannot make uſe of any weaker Paper, becauſe they uſe a reed for writing, which is cut into the form of a pen. Thoſe called *fioretto* and the *three moons* are in the greateſt requeſt, being very ſtrong and very heavy. The *fioretto* is the moſt faſhionable kind of Paper, and the deareſt. The Turks gum it, and brighten it with a poliſhing-inſtrument.

Next to Venice, Genoa is the place in Italy which exports the greateſt quantity of Paper to the Levant. The Genoeſe Papers are much lighter and not ſo dear as thoſe of Venice: they are made uſe of in winter inſtead of window-glaſs, for economy.

Upon the whole, Italy ſends Paper into Greece to the amount of 25,000*l.* and into Turkey to the amount of 250,000*l.* *which ought to be noticed by our merchants and Paper-manufacturers,* and engage them in a competition with the Italians in this important branch of the Levantine commerce, principally as Marſeilles has been, ſince late years, the only place in France that can circulate any of its Papers in Turkey.

Germany

Germany diſputes with Italy the moſt ancient knowledge of cotton and linen Paper. There were already in the 13th century cotton and linen manufactories eſtabliſhed, which exported large quantities of goods to Italy and to the Levant; and it cannot therefore be ſurpriſing, if the art of inventing linen-rag Paper is judged to belong to Germany: but nothing has been proved. The ſeveral ancient manuſcripts and pieces of linen Paper preſerved in Germany do not poſitively aſcertain that the firſt manufacture was eſtabliſhed in that country; one piece of Paper, of 1308, which Mr. von Senkenberg ſent, in 1763, to Mr. Meerman, only merits particular attention, it was ſtrong, white, pliable, and had the marks of the wire-moulds, which are the tokens of linen Paper; it was nevertheleſs glazed, and much reſembled parchment, which are tokens of cotton Paper. The Royal Society of Sciences at Gottingen judged therefore, if the date could be taken as certain, that the epocha could be taken for the true time when linen Paper was invented, notwithſtanding Profeſſor Murray believes it to be mixed Paper, of linen and cotton, manufactured at Fabriano. If it ſhould be linen Paper manufactured in Germany, it muſt have been, according to their opinion, on the frontiers of Italy.

The water-mark of a bull's head in the Paper, which ſcientific men take as an undeniable token of books printed in the firſt printing-office of Fauſt, is only the firſt water-mark made in the moſt ancient German linen Paper, and is found in all ancient German manuſcripts, and the firſt printed books, with ſome alterations: the firſt manufactured Paper of Germany is of the year

year 1312, with the water-mark of a plain bull's head, which may have been adopted likewiſe by Paper-makers of other countries, and is ſtill in practice with many ſorts of Paper that are in great demand; for example, the words *Pro Patria*, which are water-marks in Paper like our foolſcap, originated in Holland, but it is likewiſe made uſe of in French and German mills; and if the ſign of a bull's or bullock's head, which are the arms of Mecklenburgh, is to be taken as a proof that the firſt Paper was made in that country which uſes theſe arms, then is Mecklenburgh entitled to the honour of this diſcovery.

It ſeems, by the numerous relics of ancient linen-paper in Germany, that it there came into uſe at the beginning of the 14th century, and Ulman Stromer of Nuremberg, who died in 1407, began in 1360 to write the firſt work on the art of Paper-making, and he eſtabliſhed a large Paper-mill in 1390. He employed a great number of perſons, amongſt whom were three Italians, Franciſcus, Marcus de Marchia, and Bartholomæus; all of them were obliged to make oath not to inſtruct any perſon in the art of Paper-making, or to make Paper for their own account, except another of the name of George Thirman, who bound himſelf only for ten years. In the firſt year he employed two rollers, which ſet eighteen ſtampers in motion, but when he would in the ſecond year add another roller, he was oppoſed by the Italians whom he employed, who would not conſent to the enlarging of his manufacture; but they were impriſoned by the magiſtrates, and then they ſubmitted by renewing their oaths.

All the Paper-mills erected, ſince the art of printing has been invented by Koſter, of Haarlem, in 1430, cannot be brought forward as a teſtimony to prove the invention of linen Paper-making in Germany; but, after the noble invention of printing (by which ideas can be ſo eaſily conveyed and diſperſed) came in practice, the rapid extending and the multiplying of printing made the increaſe of Paper-mills neceſſary. In the environs of the Rhine, in Suabia, Franconia, Alſatia, Miſnia, and Bohemia, are the greateſt number of Paper-mills. In the Hanoverian dominions are thirty-four, and Beyer ſtates that there are in Germany five hundred Paper-mills * (thoſe in

* I ſubjoin here an account of ſome Paper-mills in Germany, as far as I could obtain knowledge thereof.

1. In the Circle of Upper-Saxony, in the Chur-Mark	4
Chur-Saxony	80
Swediſh-Pomerania	2
2. In the Circle of Lower Saxony, in the Hanoverian Dominions	34
Mecklenburgh	6
Near Hamburgh	2
3. In the Circle of Weſtphalia, in the Principality of Minden	1
County of Lippe	6
Abbey of Werden	3
County of Tecklenburg and Linden	3
4. In the Circle of the Upper Rhine, in the County of Iſenburg	2
	143

Brought over	143
Catzenellenbogen	2
Hanau-Münzenberg	1
5. In the Circle of Franconia, in the County of Henneberg	3
6. In the Circle of Suabia, near Augſburg	4
Ulm	1
7. In the Circle of Bavaria, near Regenſburg	1
8. In Bohemia	81
9. In Sileſia, in the Environs of Hirſchberg	4
Sagan	2
Wartenberg	2
Schweidtnitz	12
Which amount to	256

It

in Auſtria and Pruſſia not included), which manufacture at leaſt 2,400,000 reams of Paper. According to Count Ewald von Hertzberg, there were, in 1785, in the Pruſſian dominions, eight hundred Paper-manufactures, the revenue thereof produced 200,000 dollars annually.

Large ſums of money go notwithſtanding from Germany to foreign countries, for the purchaſe of Paper, becauſe the Paper-makers make in general coarſe Paper chiefly for printing, and the finer ſorts and writing-paper are imported. In the port of Hamburgh were imported, in 1782, 7,439 bales (of 10 reams and upwards), 4,336 reams, four caſks, and three cheſts, with Paper. That city has no more than two Paper-mills, of two vats each, which conſume 6,000 cwt. of rags. The annual increaſe of printing preſſes, and the want of rags and Paper-ſtuff, has engaged the Paper-makers to make many more reams of paper from one cwt. of rags than formerly, which renders the preſent German printing-paper very diſagreeable to the printers and readers.

It is therefore apparent that there muſt be more than 500 Paper-mills in Germany.

Large quantities of Paper-materials are loſt in Germany, becauſe the coffins in which they lay the deceaſed are filled in the moſt part of Germany with Paper-ſhavings; the bodies are likewiſe clothed with a linen ſhift or ſhirt, and are laid on a linen ſheet.

Confiſcated books are burnt in Germany.

There are in the kingdom of Sweden no more than 24 Paper-mills. In Stockholm alone were imported, in 1781, 18,579 reams of Paper: 8,142 reams for writing, 5,786 reams for printing, and 4,651 reams of packing-paper, and coarſer ſorts.

When the Czar, *Peter Alexiewitz*, viſited Dreſden, in the year 1712, he ſaw the Paper-mill belonging to Mr. Schuchart, and made a few ſheets of Paper with his own hands; he was ſo pleaſed with an art which gives ſurpriſe to every perſon who viſits a Paper-mill for the firſt time, that he engaged immediately Paper-makers, whom he ſent to Moſcow, to eſtabliſh Paper-mills at his own expence: and Mr. Pfeiffer, a German, erected, with the aſſiſtance of a carpenter from Commothau, a very fine Paper-manufactory; to which the ſaid Emperor granted great privileges. At Jaroſlow is now a Paper-mill, with 28 engines and 70 vats, which manufactures weekly 1,100 reams of Paper, and conſumes annually 800 tons of rags; and another which works 13 vats by 13 engines: they make principally Paper for Paper-hanging, which they ſell at Moſcow. There are 23 Paper-mills in the Ruſſian empire, and, notwithſtanding, they are not in want of rags (the exportation of which is prohibited), they import annually Paper to the amount of 220,000 rubles.*

In

* The duty to be paid on imported Paper is as follows: for writing-paper, from 2 to 5 rubles per ream; coloured Paper from 2 to 4 rubles; blotting-paper, 3 rubles; all Paper uſed for making cards, 3 rubles; royal, 1 ruble, 60 copecs,

In the government of Kaluga are ſeveral Paper-mills; and, according to Waſilii Szujew, all offal by the preparing and weaving of hemp and flax, with the ſpoiled yarn in the linen and ſail-cloth manufactories, are delivered to the Paper-mills.

In the commencement of the preſent century there were very few Paper-mills in Holland, and the Dutch imported great quantities of Paper ſtill in 1723 from St. Malo, Nantz, Rochelle, and Bordeaux; but, ſince that time, they have erected numerous mills, and carried on an extenſive commerce, which has ſuffered greatly ſince that country has been governed by the French Republic. In the province of Holland were, in 1770, eleven large and conſiderable Paper-mills. In Gelderland are a great many, but ſome ſo ſmall that they are only able to make four hundred reams of Paper annually: and there are alſo water-mills with ſtampers, like thoſe in Germany. But in the province of Holland there are wind-mills, with cutting and grinding engines, which do more in two hours than the others in twelve. In Saardam, a thouſand perſons are employed in Paper-making. Holland produces not one-tenth of the quantity of rags uſed in that country for Paper-manufacturing, which are ſmuggled in from France, and imported from Germany, Italy, and Portugal; the latter of which are of the coarſeſt kind. The Dutch are chiefly jealous with reſpect

to 2 rubles; ploughed letter-paper, in quarto, 1 ruble, 35 copecs; and if with gilt edges, 1 ruble, 80 copecs; printing-paper 75 copecs; paſteboards for the uſe of manufactures, 60 copecs for a hundred.

to this manufacture, and the exportation of moulds is prohibited under pain of death. They export large quantities of Paper principally to Hamburgh. From twenty to thirty thouſand reams are annually exported to Sweden; and the exportation to France, England, Denmark, and Ruſſia, is not inconſiderable, becauſe they manufacture ſome ſorts ſuperior to thoſe manufactured in other countries.

I conclude by obſerving, that they manufacture principally writing-paper, and Paper, of a violet colour, for packing ſugar-loaves. For their own printing-preſſes, they purchaſe Paper from France and Germany.

According to all reſearches, we are obliged to Mr. Meerman's indefatigable perſeverance, for knowing that in 1308 linen-paper was uſed: the diſcovery of this invention may have been made ſome years ſooner, but the preciſe period cannot be poſitive aſcertained; nor in what country this invention originated.

In Italy has been preſerved linen-paper, of 1367, and in Spain, of the ſame year; in England, of 1342; in France, of 1314; and in Germany, of 1308; it is, therefore likely, that Germany has the honour of its invention.

Ducarell ſtates in his letter to Mr. Meerman, that, in England, many documents from the year 1282 to 1347 are preſerved; but he acknowledges that it is impoſſible to aſcertain, whether theſe manuſcripts are written on Paper made from

from linen, without any mixture of cotton. Prideaux quotes a regiſter of acts from John Cranden, of the fourteenth year of the reign of Queen Elizabeth, written on linen-paper in 1320; but it has been determined, that in many inſtances, he had not a competent judgement to aſcertain the true quality. Mr. Aſtle, who wanted neither knowledge, nor the opportunity of making more effectual inquiries, is ſilent as to the time when the linen-paper came into uſe in England; all that he merely remarks is a repetition of what Prideaux has ſtated. There is in the library at Canterbury, according to the Philoſophical Tranſactions of the year 1703 (No. 288, page 515), an inventory written on linen-paper, ſpecifying the inheritance of Henry, who was prior of Chriſt-Church, and died in 1340. Dr. Wendeborn ſtates, that, in the Britiſh Muſeum, there are pieces of linen-paper from the Cottonian library, written in the reign of Edward III. in 1342; and he believes that if the manuſcripts which it poſſeſſes were carefully examined, there might be found others of a more ancient date.

As nothing farther has yet been aſcertained, or come to public knowledge, we muſt take theſe manuſcripts of 1342 for the oldeſt proof of the period when linen-paper came into uſe in England.

The art of manufacturing Paper from linen and linen-rags was only eſtabliſhed in England in the latter part of the 16th century. All Paper uſed before that time was imported from Holland and France, and ſhe paid, ſo lately as the year 1663, one hundred thouſand pounds to the latter country,

country, for imported Paper. A German, of the name of *Spielman*, had the happineſs, under the reign of Queen Elizabeth in 1588, to erect at Dartford, in Kent, the firſt Paper-mill; for which he received from her Majeſty the honour of Knighthood.

It is recorded in the Craftſman, No. 910, that King William III. granted the Huguenots from France, refuge in England, (Biſcoc and others) a patent for eſtabliſhing Paper-manufactories; and parliament granted to them other privileges: but, from a want of unrelaxed perſeverance, economy, and induſtry, their undertaking met with the ſame fate that often attends new eſtabliſhments: it went to ruin, notwithſtanding its ſucceſs in the firſt few years; and the manufacture of Paper in general decayed, until the year 1713, when Thomas Watkin, a ſtationer, in London, brought it in a ſhort time into great repute and perfection; and it is a merit attributable to him, that the preſervation of this important, moſt uſeful, and neceſſary of all arts has given riſe to the eſtabliſhment of the numerous Paper-mills that England now poſſeſſes, which manufacture very large quantities of Paper of all ſorts in the greateſt perfection: not only a great part of which is exported to foreign countries, but the importation of this commodity is now confined to a few aſſortments only, of which there cannot be a doubt, that theſe kinds of Paper yet imported, will ſoon be manufactured in this country of an equal quality, becauſe, by perſeverance, convenience in the conſtruction of theſe manufactures, ſuperior engines, preſſes and machines, and improved moulds, the induſtrious manufacturers have

been aſſiſted and enabled to give Engliſh Paper its actual pre-eminence.

Ireland has, during many years, offered and paid premiums to encourage thoſe concerned in Paper-making, for the manufacture of the beſt and the largeſt quantities of Paper; but notwithſtanding ſuch incitement, and that proviſions and labour are there cheaper than in England, it is under the neceſſity of importing conſiderable quantities from hence, and paying a higher price than for their home-manufactured Paper.

Scotland manufactures good printing-paper, which greatly ſurpaſſes that of the Germans, in whiteneſs and ſtrength.—Meſſrs. Foulis, printers, at Glaſgow, are ſaid to export annually on an average two millions of copies of books to foreign countries, and it muſt be preſumed that they are partly indebted to the ſuperiority of the Scotch Paper, over that of Germany and the Northern countries, for the pre-eminence to which their printing-houſe has been raiſed.

England, which does not furniſh ſuch conſiderable quantities of rags as might have been expected from the number of its inhabitants, and their ſuperior cleanlineſs in linen, notwithſtanding, conſumes at preſent in its extenſive and numerous Paper-mills, more rags than any other country in Europe. The revenue ariſing from the exciſe-duty on Paper amounted, in the year before the laſt, to 140,000*l.* If we now calculate that ſix-fifteenth parts of the whole quantity of Paper made in England is writing and printing Paper, which pays 2½*d.*

per pound exciſe-duty; that five-fifteenths are of the ſecond claſs of paper, paying one penny per pound; and that, of the remaining four-fifteenth parts, one-half pays a halfpenny per pound, and the other half nothing; we find that twenty-four million pounds weight of rags and other paper-ſtuff is annually manufactured into Paper.*

One reaſon that may be aſſigned is, that they are not ſo carefully gathered as in other countries; but another and more powerful one is, that the greateſt part of the Engliſh families are able to live more comfortably than the people of other countries, and think the ſaving of rags not worth their notice, or think them of ſo trifling a value, that a great part is burnt or deſtroyed. But, as I have before ſtated, that the Britiſh nation is in part indebted for their wealth, and pre-eminence above all other nations, to the manufacture of Paper, and the art of printing, writing, and drawing; and as it is certain, that the quantity of Paper manufactured in England is the next to that of wool, cotton, and linen, and employs not only many thouſands of hands in the mills, but gives bread to ſtationers, authors, printers, bookſellers, and bookbinders, which are ſo numerous with their dependents, that it may be taken for granted, that this manufacture gives livelihood to a greater number of perſons than any other; every head of a family ſhould therefore conſider this branch of commerce and revenue as a national concern, and follow the example of the Dutch families, who lay by all old rags, clean waſhed,

* The importation of rags from the continent, in 1799, was 6,307,117 *lb.*

and

and ſell them aſſorted annually to the agents of the Paper-mills: and there can be no doubt but the ſaving of rags and waſte Paper in England would equally contribute to the advantage of this valuable manufacture.

By the act of parliament, which prohibits, under a penalty, the burial of the dead in any other dreſs than wool, may be ſaved about 250,000 pounds weight of linen * annually; which in other countries periſh in the grave: but this is of little conſequence relative to the great conſumption of rags, and does not form more than a one hundredth part.

The want of this article obliges us therefore to import the required quantity for our mills from abroad, until other ſubſtitutes can be converted to anſwer the purpoſe of rags: till thoſe are brought to perfection and generally adopted: and until the Paper manufactured thereof is univerſally protected, by every well-wiſher to his country. The value of the Paper manufactured in 1784 in England has been ſtated to amount to 800,000*l.* and it will not be over-rated if we give the preſent annual value, by reaſon of the increaſe of the uſe of Paper and of its price, at one million and a half ſterling; which, after it has gone through the hands of the ſtationers, and is finiſhed by the authors, artiſts, engravers, printers, and bookbinders, and put up for ſale by the book

* Calculating that out of thirty perſons living, on the average, one dies annually, and that one pound weight of linen might be uſed at every burial, and the number of inhabitants ſeven millions and a half.

and

and print ſellers and ſtationers receives ſuch additional value, that its amount may be eſtimated at ſome millions more.

Parliament has therefore, for the ſupport of this manufacture enacted, that rags, old nets, and ropes (which are uſed for manufacturing paſteboards, wrappers, and packing-paper), can be imported duty free; and laſt ſeſſion, it likewiſe allowed the free importation of all waſte-paper, provided it is torn into pieces ſo that it cannot be uſed otherwiſe than for being re-manufactured. Theſe meaſures will in ſome degree aſſiſt the Manufacture recently eſtabliſhed for that purpoſe; but notwithſtanding, cannot ſufficiently obviate the lamentable ſcarcity, and greatly reduce the price of rags and other paper-ſtuff: the conſumption of the Paper manufactured of the latter materials (old nets and ropes) has likewiſe increaſed very much, and muſt be the more conſiderable as the commerce of this country is extended.

Theſe circumſtances, and the eſtabliſhment of the *Regenerating-Paper-Manufacture*,* brought to my recollection what Bruyſet, Levier de Liſle, Fonde, Gleditch, Greaves, Guetard, Klaproth, Linne, Clarus Mayer, Reamur, Schäffer, Seba, Stakel, Strange, and other ſcientific men had noticed, and their ideas on ſubſtitutes for paper-materials. Theſe authors have ſtated, that as cotton, flax, and hemp, are the origin of paper

* The remanufacturing of Paper has been long practiſed by the Chineſe; and there is, in one of the ſuburbs of Pekin, a conſiderable paper-manufacture for that purpoſe, which gives employ to numerous perſons who collect waſte-paper, which is purchaſed at a low price.

and rags, other vegetables of a tender and pliable nature might probably be converted into a mucilaginous pulp, and adopted in the manufacture of Paper; and farther, that thoſe vegetables that are of a brittle and harſh nature, but which can be obtained in large quantities and at moderate prices, might by art and perſeverance be made tender, without deſtroying that quality which is neceſſary to be retained in paper-ſtuff. It is a grand *deſideratum*, that theſe ſuggeſtions ſhould be brought into effect; and it is ſurprizing that the obſervations of the authors above quoted ſhould not have been earlier attended to by ſcientific men, or rather by intelligent paper-makers, who had the road thus opened to them for their inveſtigation: for, ſhould any man have diſcovered a commodity, which could be cheaply and plentifully ſupplied in this country, as a ſubſtitute for rags, &c. to mould unexceptionable Paper, ſuch a man would amply merit the approbation and encouragement of the public.

Dr. Schäffer, it is true, worked with perſeverance, induſtry, and ardour, to prove that numerous vegetables were qualified to make Paper, and his fame will be immortalized; but, notwithſtanding that this author theorized on the ſubject with great ability, he accompliſhed nothing ſatisfactory by his experiments, which only tended to prove that various vegetables could probably be ſo molified as to make uſeful Paper with the addition of a ſmall quantity of rags: neither himſelf, nor any perſon who has followed him, has ever been able to make it at all without rags, or fit for printing, writing, paperhanging, and other purpoſes.

Travellers affirm that the Chineſe and Japaneſe uſe a lye in their paper-manufactories, by which they convert plants, the bark of trees, and ſeveral other vegetables, into a pulp,* which is afterwards moulded into a large and beautiful Paper: this Paper, however, notwithſtanding its apparent ſmoothneſs, is very liable to break. No author has ſatisfactorily deſcribed the ingredients that are uſed in making this lye, or the farther proceſs that vegetables muſt undergo, before they are ſufficiently macerated and reduced to a ſtate to be formed into Paper: and all farther information has been cautiouſly concealed from us.

In addition to the high price to which Paper has already advanced, the accounts that have been received from various parts of the continent ſhew that the price of rags will augment rather than abate. Conſiderations of this kind induced me to make farther trials, and endeavour to accompliſh that which had been thought impoſſible by others, and which had baffled the attempts of many ingenious men. My perſeverance and labours have been crowned with ſucceſs.

I have now had the ſatisfaction of witneſſing the manufacture of ſeveral thouſand reams of perfectly clean and white Paper, ſince the 1ſt of May, made from old waſte, written, and printed Paper.† Succeeding thus far in the attempt,

* All Paper made in the province of Che-Kyang is manufactured from the ſtraw of rice and other grains.

† Under the inſpection of the truly ingenious Mr. Carpenter.

I pro-

I profeſs to have farther views, in aſſiduouſly endeavouring to manufacture the moſt perfect Paper from ſtraw and other vegetables; which, if ſucceſsful, will render this commodity more uſeful than for the purpoſes it has been hitherto applied, and more intereſting of courſe to the landed property of this kingdom, and to the public at large. I have in a great meaſure accompliſhed this undertaking: for, although I cannot yet boaſt of having manufactured the moſt perfect ſtraw-paper, theſe lines are printed upon it, to demonſtrate the infant progreſs of ſo ſingular an undertaking, and to prove its poſſibility, notwithſtanding the opinion of many ſcientific men, particularly that of the ingenious Breitkopf, that Paper made from ſtraw cannot be uſed for printing. This ſpecimen leaves no doubt in my mind, that, when the manufactory has been regularly eſtabliſhed with the neceſſary implements, I ſhall make ſtraw-paper in as great perfection as that which is now re-manufactured from waſte-paper; but I have thought it adviſeable, imperfect as this ſample may appear, to lay it at the feet of MY SOVEREIGN, in order to prove as ſpeedily as poſſible, to the public at large, the progreſs I have made in the proſecution of my deſign; and thereby to prevent fallacious reports, and erroneous impreſſions being made on their minds, as well as to remove the prejudices which are generally cheriſhed againſt new diſcoveries.

I flatter myſelf that theſe exertions will meet with the approbation and ſupport of the community at large, as the diſcovery will prove of great national benefit: it will increaſe the revenue; it will employ numerous hands of both ſexes and of

all

all ages; it will prevent the neceſſity of ſo much money being ſent to the continent, for the purchaſe of rags; * it will increaſe the value of land; and it will ultimately reduce the price of Paper. And if the manufacture of Paper from ſtraw alone ſhould be only ſerviceable for paſteboards, packing-paper, and paper-hangings,† it is hoped and believed that this country will thereby be enabled to provide the latter article to the *whole world, at a lower rate than it is poſſible to manufacture it from rags*. But whether or not this country can avail itſelf of all the advantages that are likely to reſult from a diſcovery which promiſes to become ſo generally uſeful, as the manufacture of good Paper from *Straw*, will, in my humble opinion, intirely depend on ſuch meaſures as the legiſlature of this country ſhall in their wiſdom think it prudent to adopt, in order to prevent the diſcovery from being known to other countries:— a meaſure perhaps not undeſerving the attention of the Britiſh Government, at this conjuncture, when the ſplendour of its

* If from 5,000 to 6,000 loads of ſtraw will be converted annually into Paper, uſed for paper-hangings, it will be equal to the quantity of rags imported from the continent in 1799. Thoſe rags are principally uſed for that kind of Paper (elephant), they being of a ſtronger texture than Engliſh rags. By this means, the money which is now ſent to the continent, for that article, would be ſaved. And as paper-hangings made from ſtraw-paper may be manufactured much cheaper, to the taſte of the people abroad, than they can make it from rags, it will increaſe the employ of hands, and lead them to ſend their money to this country for the purchaſe of it.

† Of its general uſefulneſs, for the purpoſe of paper-hanging; Mr. Duppa, a gentleman of eminence, ingenuity, and ſuperior taſte in that ſcience, has no doubt.

manufactures and commerce is more envied than at any former period of our hiſtory.

I therefore flatter myſelf that I ſhall experience protection and ſupport from the powers of Government, and through them overcome all prejudices againſt this newly invented *Straw-paper;* not doubting that I ſhall, by my unremitting perſeverance, bring the diſcovery to the greateſt perfection, and that my efforts will render it eligible for general uſe: then the opinions and judgements, which are inconſiderately or enviouſly circulated to the injury of every new eſtabliſhment, will be turned to its advantage, and will inevitably promote the reduction of the high price of Paper.

And it would be productive of the greateſt ſatisfaction, if, by farther experiments and reſearches, I can accompliſh the object I have in view, namely, that of manufacturing Paper from vegetables, for the purpoſe of making bank-notes, which I flatter myſelf I ſhall be able to effect. A diſcovery of ſuch deſcription muſt be a ſource of great and pleaſant reflection to every philanthropic mind, ſince the opportunities of forgery on the Bank of England, which at preſent exiſt, will be immediately done away, and the public mind relieved from hearing of ſuch crimes, and of the executions which enſue from the conviction of the offenders. That ſuch will be the good conſequences reſulting to the community, from manufacturing Paper of the ſaid materials for the before-mentioned purpoſe, muſt be manifeſt, becauſe the mixture of vegetables from which the Paper would be made might remain a ſecret,

if the neceſſary meaſures for that purpoſe are adopted: conſequently no forgery could henceforth be committed on the Bank, as long as ſuch Paper ſhould be uſed in making bank-notes, becauſe the counterfeiting of the Paper cannot take place, as long as the materials from which it is made is unknown, and as long as the Patent granted by *His Majeſty* is in force.

APPENDIX.

AS an Appendix to this little Tract, I think it proper to ſubmit a few more remarks on the National Importance of diſcovering materials which can be converted into Paper, and grow ſufficiently abundant in Great Britain, without the neceſſity of importing them from foreign countries.

The following lines are printed upon Paper made from Wood alone, the produce of this country, without any intermixture of rags, waſte paper, bark, ſtraw, or any other vegetable ſubſtance, from which Paper might be, or has hitherto been manufactured; and of this the moſt ample teſtimony can be given, if neceſſary.

Having thus far ſucceeded in my reſearches, to make an uſeful Paper from one kind of Wood, I

doubt not, but, that I ſhall find many others equally eligible for the ſame purpoſe, of which I truſt it will be in my power, within a few weeks, to give indiſputable proof that my expectations have been well founded, and that I have not cheriſhed a viſionary opinion.

Hiſtory furniſhes us with numerous examples of one diſcovery giving birth to others, and, if my ſucceſs of having encreaſed the quantity of Paper materials, by rendering theſe applicable to that which have never been before applied to ſuch a purpoſe, ſhould incite active and induſtrious artiſts, to make farther improvements in their various manufactures, my feelings will be amply gratified. Various hints may be ſuggeſted to thoſe who are already acquainted with the properties of Paper, when paſted in lamina on each other; it may, by this means, be made to form a ſubſtance, as durable and more impenetrable than oak.

Having long admired the celebrated manufacture of Mr. *Clay*, at Birmingham, who has demonſtrated to what perfection and beauty it has been brought, it will, in the courſe of time, perhaps not be ſurpriſing to find, that objects of greater conſequence will engage their attention in the ſame purſuit, and

prove,

prove, that the properties from ſucceſſive layers of Paper, may be found a ſubſtitute for many purpoſe, for which at preſent foreign Wood is required.

One of the greateſt obſtacles to the improvement and extenſion of this art has been probably the ſcarcity of the raw materials. Now that theſe are found *at home* in ſufficient abundance, means may be found to ſupply manufactures with any quantity required, at reduced prices.

It may probably be ultimately proved, that Paper thus prepared, will be a lighter, neater, and more durable covering for buildings of all kinds, and it is equally true, that the ingredients, with which the cement can be compoſed, will render this ſubſtance not only incombuſtible, but more durable than ſlates, tiles, (which in the courſe of time become brittle) and wood in its natural ſtate, and incorruptible by inſects. Who can ſay that coach-makers, chair-makers, and cabinet-makers, will not make uſe of it for carriages, chairs, and elegant houſehold furniture, and reflect that a ſubſtance poſſeſſing ſuch ſuperior properties ought to be preferred; having flexibility, hardneſs, and capability of being worked with infinite greater neatneſs and luſtre than wood, which is ſo much affected by the air and weather.

Converting

Converting wood and ſtraw into Paper, may therefore be rendered uſeful for a variety of purpoſes; and the ſubſtance of the Wood Paper on which theſe lines are printed, (which is the firſt attempt to make it in a quantity) exhibits an indiſputable proof, that uſeful Paper may be manufactured from the hardeſt part of wood alone, deſtitute of its pith or bark; and, if any of the ſuggeſtions here ſtated, as to the application of the manufactured material ſhould be thought reaſonable, experiments of ſome able manufacturers will prove, that this Paper can be again converted into a ſubſtance, more hard and durable than any wood of natural growth.

Conſidering, in its full extent, the numerous uſes to which the diſcovery of making Paper from wood and ſtraw, which always can be obtained in this country at moderate prices, can be applied, it is certainly an invention that merits attention and ſupport. If only fit for the manufacture of inferior ſorts of Paper, and Paper-hangings, this country will be enabled to cope with the whole world in this ſpecies of commerce, on the moſt advantageous terms, and to enrich herſelf, by opening this new ſource of trade, very lucrative to the revenue, and allowing the manufactured commodity to be ſold for leſs than the preſent price of Paper; whilſt, at the ſame time,

it will make ſeveral materials * more valuable, and, by giving employment to thouſands of women and children, thereby eſtabliſh an influx of real wealth into this country.

The wiſdom of the legiſlature has rendered it neceſſary that the ſpecification of every patent ſhould be made public within the ſpace of twenty-eight days, which has been ſometimes extended to ſix months. The patentee's benefit exiſts for fourteen years, and is extremely well protected by the law againſt the infringement of its privileges, by the inhabitants of Great Britain; but it appears very extraordinary, that every patent is open for the inſpection of foreigners, and that the patentee remains unprotected with reſpect to them. A pamphlet has been ſuffered to be publiſhed monthly, ſince the year 1794, which deſcribes not only the exiſting patents of the country, but contains complete drawings and deſcriptions of new-invented machines. This pamphlet has been, and will be, immediately tranſlated into the continental languages; a practice which has, no doubt, proved highly detrimental to the revenue and commercial intereſt of this country.

* Saw-duſt and wood-ſhavings.

If a patent is obtained for an ingenious invention, which may have coſt the author many years intenſe labour and ſtudy, and the reſult produces great national wealth by the manufacture and exportation of the commodity, the proſpects may be clouded in an hour, and all expectation baffled, by foreigners reading the ſpecification, who, by erecting ſimilar manufactories abroad, under greater advantages, deprive the country of the revenue and commerce. If this ſubject was duly weighed, it ſurely might be remedied. It may be aſked, why a patent is to be openly exemplified before its term is expired? for, as it can be of no uſe to the inhabitants of of this country, during the ſpace of fourteen years, for what purpoſe is it expoſed? and why are foreigners permitted to reap the benefits to which this country is only entitled? It is undeniable, that it operates as a perpetual diſcouragement to the future efforts of genius, preventing monied men carrying the moſt valuable diſcoveries into effect. The doubtfulneſs of ſucceſs alone ſufficiently damps the ardour, perſeverance, and exertions neceſſarily required in the purſuit of ſkilful and laborious inquiries; but, having ſucceeded to his utmoſt wiſhes, and after having incurred very injurious expences in the proſecution of his deſign, he is foiled in all his hopes of compenſation, by the

 expoſure

expoſure of the means through which the diſcovery has been effected. This conſideration alone ought to weigh with thoſe by whom this evil can be remedied to the individual. But, much as it may be lamented, this injury bears no proportion to the loſſes which the revenue and commerce ſuffer.

It therefore appears impolitic in the laſt degree to expoſe the exemplification of a patent to public diſcloſure, and to be a *deſideratum* of ſuch infinite importance, that the Legiſlature may think of ſome method to prevent the art from being divulged in a patent, and being purloined by foreigners, who are jealous of the greatneſs of the manufactures, commerce, and navigation, of Great Britain.

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